

DRAFT EVALUATION REPORT  
PILOT SOIL VAPOR EXTRACTION AND TREATMENT  
OPERABLE UNIT CARBON TETRACHLORIDE PLUME  
FORMER FORT ORD, CALIFORNIA

TOTAL ENVIRONMENTAL RESTORATION CONTRACT  
CONTRACT NO. DACW05-96-D-0011

Submitted to:

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Corps of Engineers  
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Revision A

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## ***List of Acronyms and Abbreviations***

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Army	U.S. Department of the Army
bgs	below ground surface
CT	Carbon Tetrachloride
CTP	Carbon Tetrachloride Plume
FWV	Field Work Variance
GAC	granular activated carbon
OU	Operable Unit
ppb	parts per billion
SVE	Soil Vapor Extraction
VOC	volatile organic compound



## 1.0 Introduction

---

This report describes the operation of a pilot soil vapor extraction (SVE) and treatment system to remediate vadose zone soils in a suspected source area for the Operable Unit Carbon Tetrachloride Plume (OU CTP) at former Fort Ord, Marina, California. This report was prepared for the U.S. Department of the Army (Army) by Shaw Environmental, Inc. (Shaw) under the Total Environmental Restoration Contract II No. DACW05-96-D-0011.

The pilot SVE system was implemented because analytical results from soil gas and groundwater samples collected in the vicinity of Lexington Court and Ready Court suggested that a source of carbon tetrachloride (CT) was present in the vadose zone soils in this area (Mactec, 2004). These previous investigations showed that soil gas concentrations were higher in proximity to the water table than at shallow depths. Based on these investigations it appeared that soil gas could be a source for continuing groundwater contamination. The suspected source area for the OU CTP is located in the northern portion of former Fort Ord, generally south of the city of Marina and north of Imjin Parkway (Figure 1-1). Figure 1-2 shows the estimate concentration of CT prior to the operation of the pilot CT SVE system.

The objectives for the pilot SVE system were established in the *Final Work Plan and Sampling and Analysis Plan, Pilot Soil Vapor Extraction and Treatment, Operable Unit Carbon Tetrachloride Plume, Former Fort Ord, Marina, California* (Work Plan/SAP), (Shaw 2004b). The Army directed Shaw to design a mitigation that would:

- Provide source control for the CT groundwater plume, and
- Alleviate the potential for vapor intrusion into the nearby housing area

As described in this report, Shaw installed three new SVE wells and converted two existing monitoring wells to extraction wells. The extraction wells were tied in via pipeline to a vapor treatment system installed in an unused garage at Lexington Court. The treatment system used granulated activated carbon (GAC) to remove CT and other volatile organic compounds (VOCs) from the extracted soil vapor. Sixteen new nested monitoring probes, plus three existing shallow probes, were used to monitor system performance. This report documents that the pilot SVE has been successful in removing CT and other VOCs that were contained in the vadose zone to non-detectable or low estimated concentration below the reporting limits in a majority of the probes measured.

Prior to operation of the pilot SVE system, Shaw conducted indoor air sampling at a building in Lexington Court (Photo 1-1). The results showed that the concentrations of VOCs present in

indoor air samples were within the range of background concentrations measured during ambient air monitoring activities conducted at various other locations at the former Fort Ord. These results suggested that the subsurface vapors from the CT plume were not contributing significantly to VOCs in indoor air. The indoor air sampling results are presented in the *Draft Final Report, March 2004 Indoor Air Sampling, Lexington Court, Former Fort Ord, California, Revision 0* (Shaw, 2004c).

## 2.0 Operations Summary

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A chronology of the work conducted for the pilot CT SVE is presented in [Table 2-1](#). Construction began on February 10, 2004. The pilot SVE system was operated in two periods, from April 6 to June 14, 2004 (Phase I), and from September 9 to November 8, 2004 (Phase II).

Construction operations included the installation of three new SVE wells and the conversion of two existing monitoring wells to extraction wells. The extraction wells were tied in via pipeline to the vapor treatment system installed in an unused garage at Lexington Court. [Figure 2-1](#) shows the site layout, the location of the extraction wells, and the collection header system layout. The construction details for the extraction wells, wellheads, and vaults are shown in [Figure 2-2](#). Twelve new nested monitoring probes and three existing shallow probes were used during Phase I to monitor system performance. Four additional monitoring probes were added prior to Phase II. [Figure 2-1](#) shows the location of the monitoring probes. The construction and installation details for the monitoring probes are shown in [Figure 2-3](#). [Table 2-2](#) is a summary of completion depths of all wells and probes. [Photos 2-1](#) through [2-3](#) show construction of the wells, pipelines and vaults.

The blower unit for the treatment system was located inside the garage at 6277 Lexington Court ([Photo 2-4](#)). Soundproofing was added to reduce noise ([Photo 2-5](#)). The treatment system used two 2000-pound GAC units to remove CT and other VOCs from the extracted soil vapor. These units were installed outside the garage within a security fence ([Photo 2-6](#)).

System shakedown occurred in early April 2004. Phase I system operation started April 6, 2004. The system had some initial down time as adjustments were made to increase the operational efficiency. Sampling initially followed the schedule in the Work Plan/SAP (Shaw, 2004b). A significant reduction in the VOC concentrations was observed after initial results were received from the samples collected from the system, extraction wells, and probes. Based on this information, Field Work Variance (FWV) TO-077 was implemented on May 18, 2004, in order to modify which probes and depths required sampling.

After a significant reduction in concentrations was observed in all sampling locations, which demonstrated the efficacy of the system, the SVE was shut down on June 14, 2004. The monitoring data was evaluated to determine if additional operation was justified. While the system was shut down, four additional probes, approved by FWV TO-082, were installed to provide monitoring data to the north of the area originally evaluated. Also while the SVE was shutdown, three rounds of sampling were conducted in two probes to monitor for rebound.

Based on the monitoring data it was determined that the SVE would be operated for an additional period. Phase II operation of the pilot CT SVE began on September 9, 2004, and concluded on November 8, 2004. Following an informal data presentation to the regulatory agencies, the blower and GAC vessels were removed. The wells, pipelines and probes remain in place.

### 3.0 *Pressure and Radius of Influence*

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Pressure measurements were taken at the extraction wells and monitoring probes following the schedule outlined in the work plan. Applied pressure and flow rate measurements were made on the extraction wells using a GEM-500™ Landfill Gas analyzer. More sensitive induced pressure measurements at the probes were made using a Druck DPI 740, precision pressure indicator.

The measurements were made to confirm that the SVE system would meet the design objective for induced vacuum [0.1 in water column vacuum within the pre-SVE 20 parts per billion (ppb) CT contour].

Figure 3-1 shows the measured vacuum contours in the deep probes (85 feet depth). Figure 3-2 shows the modeled vacuum contours in the intermediate depth probes (65 feet). As can be seen from these figures, the design goal was generally achieved. The induced vacuums at the new probes (SGP-63, -64 and -65) installed to the north of the original probes was at or slightly below 0.1 in water column goal, indicating that the SVE was only partly efficient at these locations.

## 4.0 Pilot Soil Vapor Extraction System Operation

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As previously stated, the system began Phase I operations on April 6, 2004. Initially some adjustments had to be made to the system for optimal performance. In addition, throughout Phase I operations periodic maintenance was required on the generator that was used to power the pilot SVE system, and the blower unit. The initial adjustments and maintenance reduced system performance only slightly. Phase I operations of the pilot SVE system were shutdown on June 14, 2004.

Phase II operations began on September 9, 2004. Except for minor maintenance on the system, Phase II has been operating at very close to 100 percent efficiency to date. [Figure 4-1](#) presents the daily operating hours of the pilot SVE system for both Phase I and II operations.

The following table provides an operating statistics summary for Phases I and II of pilot SVE system:

<b>Phase I</b>	System stopped 06/14/04
Total Available Hours Since Start (to 06/14/04 shutdown)	1704 (10.1 weeks)
Total Hours of Operation	1410.1 (8.4 weeks equivalent)
Percent Utilization (hours operated / Total available hours)	82.8%
<b>Phase II</b>	System stopped 11/08/04
Total Available Hours Since Start (09/09/04)	1464 (8.7 weeks)
Total Hours of Operation	1440.6 (8.6 weeks equivalent)
Percent Utilization (hours operated / Total available hours)	98.4%
<b>Combined Phase I and II</b>	
Total Available Hours for Operation Since Start (06/14/04)	3168 (18.8 weeks equivalent)*
Total hours of Operation (Phase I + Phase II)	2850.7 (17 weeks equivalent)
Percent Utilization (hours operated / Total available hours)	90%

*\*does not include shutdown between 6/14/04 and 9/9/04*

## 5.0 Volatile Organic Compound Analytical Results

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Samples were collected from the system [influent, between GAC beds (midstream), effluent], monitoring probes, and extraction wells. The chemicals of concern were four VOCs that have been detected in the soil gas and the underlying groundwater plume:

- Carbon Tetrachloride
- Chloroform
- Trichloroethene
- Tetrachloroethene

Samples were analyzed by U. S. Environmental Protection Agency Method TO-15 (EPA, 1999) which is a procedure for sampling and analysis of VOCs in gas. The VOCs are separated by gas chromatography and measured by a mass spectrometer or by multi-detector techniques. The method presents procedures for sampling into canisters to final pressures both above and below atmospheric pressure (respectively referred to as pressurized and sub-atmospheric pressure sampling). Analysis of samples was performed by Air Toxics Ltd., Folsom, California.

### 5.1 Soil Vapor Extraction System Monitoring

Analytical results for Phase I and Phase II analysis of influent, midstream, and effluent results are presented in [Table 5-1](#). [Figure 5-1](#) shows the concentration of CT in the influent samples versus time. As can be seen from this plot, the concentration decays exponentially over time; the largest reductions were seen in the first weeks of operation. [Figure 5-2](#) shows the concentration of the other VOCs measured in the influent versus time. The data demonstrates that these concentrations also decreased as the pilot SVE system was operated. [Figure 5-3](#) presents a plot of the extraction well CT concentration versus the total cumulative operation time of the pilot SVE system.

Results for all VOCs in the midstream and effluent samples were non-detectable indicating no breakthrough.

### 5.2 Monitoring Probe and Extraction Well Monitoring

Analytical results for Phase I and Phase II analysis of the monitoring probes and extraction wells are presented in [Tables 5-2A](#) and [5-2B](#). All monitoring probe and extraction well concentrations decreased over time. The decrease in concentrations observed in monitoring probes correlates to the location of the probe relative to the extraction wells. The closer a probe was to the location of an extraction well, the more induced vacuum was created, and consequently the greater amount of VOCs that were removed from that location.

After Phase I operations were terminated on June 14, 2004, three rounds of additional probe sampling occurred over a period of 3 months in the deep probes of SGP-55 and SGP-62 to evaluate for potential rebound that might occur after the pilot SVE system was shut down. [Figure 5-4](#) presents a plot of the data for these two deep probes. As can be seen from the plot, there was a small concentration increase in both probes after Phase I operation shutdown.

[Figures 5-5, 5-6, and 5-7](#) present the concentration of CT that were measured in the deep, intermediate and shallow monitoring probes. [Figure 5-8](#) presents the CT results for samples collected from the near-surface monitoring probes. [Figures 5-9, 5-10, and 5-11](#) present results for chloroform, trichloroethene, and tetrachloroethene in the deep monitoring probes.

[Figure 5-12](#) presents the results from sampling SGP-66 located near Preston Drive approximately 1,200 feet north of the center of the SVE area. This probe was installed at a location where the CT concentration in groundwater has been observed to be approximately one order of magnitude higher than in the SVE area. There were no detectable VOCs in SGP-66.



## **6.0 Modeling of Volatile Organic Compound Results**

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In order to obtain a more complete visualization of the CTP, analytical results obtained from the extraction wells and monitoring probes were modeled using 3-dimensional visualization software (Environmental Visualization System, developed by C Tech Development Corporation). This modeling was additionally performed to gain information about the mass of CT that was present in the subsurface. Concentrations were estimated at control points that were used during the modeling. [Figure 6-1](#) presents a horizontal slice 80 feet below ground surface (bgs) generated from modeling the monitoring data. [Figures 6-2](#) and [6-3](#) present slices of the modeled data 50 feet and 20 feet bgs.

## 7.0 *Mass Removed from the CTP*

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The amount of CT removed by the pilot SVE system was calculated from influent analytical results, flow rates, and operation times. [Figure 7-1](#) presents a plot of influent CT concentration versus cumulative operating hours showing the exponential equation used to calculate mass. Flow rate (cubic feet per minute) was determined by the measurement of temperature, barometric pressure, pipe diameter, and pitot tube pressure at the pilot SVE system. Measurements were made periodically for these parameters at the system, and extrapolated between data points. [Figure 7-2](#) presents the cumulative mass of CT removed versus cumulative operating hours (for Phases I and II operations). The calculated amount of mass removed from the soil gas CTP by this methodology is approximately 0.73 pounds.

As stated in the previous section, 3-dimensional computer modeling of the monitoring probe results was also used to determine the mass that was contained with the CTP. This calculation was made for the volume enclosed by the 1 ppb CT contour. The mass calculated by this methodology was 0.31 pounds CT. It would be expected that this method would yield a lower mass since the model was artificially truncated to the north of the SVE where there was not enough pre-SVE data to contour.

## 8.0 Conclusions

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As evidenced by the reduction in VOCs in the influent, monitoring probes, and extraction wells, the pilot SVE system was very effective in removing VOCs, specifically CT from the soil gas CTP.

The objectives for the SVE were stated in the Work Plan/SAP as follows:

*Implement a pilot mitigation that will:*

- *Provide source control for the CT groundwater plume, and*
- *Alleviate the potential for vapor intrusion into the nearby housing area*

*At the end of 3 months the effectiveness of the mitigation will be evaluated. If the system is efficiently removing CT, operation will continue at the discretion of the Army until either: a) cleanup levels have been attained, or b) removal of CT is low and continued operation is not cost effective.*

Evaluation of the SVE results shows that these objectives have been met:

- Remaining concentration VOCs above the groundwater are low, and will be addressed in the CT Remedial Investigation/Feasibility Study.
- Shallow soil concentrations are very low and are not a significant source for vapor intrusion.
- Diminishing marginal returns from continued operation are clearly demonstrated by the asymptotic trends in the influent and monitoring probes.

## 9.0 References

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U. S. Environmental Protection Agency (EPA), 1999, Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, 2nd Edition, Compendium Method TO-15, Determination of Volatile Organic Compounds (VOCs) In Air Collected In Specially-Prepared Canisters And Analyzed By Gas Chromatography/Mass Spectrometry EPA/625/R-96/010b

Mactec, 2004, OU CTP SVE Pilot Study Test Letter Report, January 2004. Mactec Engineering & Consulting, Petaluma, California

Shaw Environmental (Shaw), 2004a, Final Work Plan and Sampling and Analysis Plan, Pilot Soil Vapor Extraction and Treatment, Operable Unit Carbon Tetrachloride Plume, Former Fort Ord, California, Revision 0

Shaw, 2004b, Draft Final Report, March 2004 Indoor Air Sampling, Lexington Court, Former Fort Ord, California, Revision 0

## *Tables*

**Table 2-1**

**Project Chronology**

<b>Date</b>	<b>Activity</b>
2/10/2004	Start of building modifications at 6277 Lexington Court
2/10/2004	Start of piping installation (surveying, grubbing, etc.)
3/1/2004	Start of drilling operation
3/5/2004	Completion of drilling of new probes
3/23/2004	Completion of security fence
3/29/2004	Completion of modification to garage including sound walls
4/6/2004	Installation of blowers and GAC units complete
3/25/2004	Completion of piping installation
3/25 - 4/5/04	Baseline probe/extraction well sampling
4/6/2004	System shakedown test
4/6/2004	Phase I System startup
4/6/2004	System sampling
4/7/2004	System sampling
4/13/2004	System sampling
4/16/2004	System sampling
4/27 - 4/28/04	System/Probe/Extraction well sampling
5/18/2004	Implementation of FWV 077 (Schedule change)
5/18 - 5/19/04	System/Probe/Extraction well sampling
6/14/2004	System/Extraction well sampling
6/14/2004	Phase I system shutdown
6/15 - 6/18/04	Probe sampling
7/2/2004	Round I rebound sampling
7/20/2004	Round II rebound sampling
8/4/2004	Round III rebound sampling
8/6/2004	Implementation of FWV 082 (New well installation)
9/1 - 9/2/04	Probe sampling (new baseline)
9/2/2004	Installation of 4 new probes completed (63,64,65, & 66)
9/9/2004	Phase II system startup
9/9/2004	System sampling
9/12/2004	Implementation of FWV 084 (revised operation and sampling schedule)
9/23/2004	Probe/System sampling
10/7/2004	Probe/System sampling
10/14/2004	Probe sampling
10/23/2004	Probe sampling
11/8/2004	Extraction Well/System sampling
11/8/2004	Phase II system shutdown

Table 2-2

**SVE Extraction Wells and Probes  
Summary of Completion Depths**

Probe/Well Identification	Date Completed	Probe Type	Completion Depth (feet) BGS <sup>1</sup>	Top of Screen (feet) BGS	Bottom of Screen (feet) BGS
CTP-SGP-51	3/1/2004	Shallow	86	24	26
CTP-SGP-51	3/1/2004	Intermediate	86	54	59
CTP-SGP-51	3/1/2004	Deep	86	79	84
CTP-SGP-52	3/2/2004	Shallow	86	24	30
CTP-SGP-52	3/2/2004	Intermediate	86	54	58
CTP-SGP-52	3/2/2004	Deep	86	79	84
CTP-SGP-53	3/4/2004	Shallow	86	24	29
CTP-SGP-53	3/4/2004	Intermediate	86	54	60
CTP-SGP-53	3/4/2004	Deep	86	80	85
CTP-SGP-54	3/4/2004	Shallow	86	25	30
CTP-SGP-54	3/4/2004	Intermediate	86	55	60
CTP-SGP-54	3/4/2004	Deep	86	80	85
CTP-SGP-55	3/4/2004	Shallow	86	25	30
CTP-SGP-55	3/4/2004	Intermediate	86	55	60
CTP-SGP-55	3/4/2004	Deep	86	80	84
CTP-SGP-56	3/3/2004	Shallow	86	25	29
CTP-SGP-56	3/3/2004	Intermediate	86	55	60
CTP-SGP-56	3/3/2004	Deep	86	80	85
CTP-SGP-57	3/2/2004	Shallow	86	25	30
CTP-SGP-57	3/2/2004	Intermediate	86	55	59
CTP-SGP-57	3/2/2004	Deep	86	80	84
CTP-SGP-58	3/2/2004	Shallow	86	25	29
CTP-SGP-58	3/2/2004	Intermediate	86	55	59
CTP-SGP-58	3/2/2004	Deep	86	80	84
CTP-SGP-59	3/1/2004	Shallow	86	24	30
CTP-SGP-59	3/1/2004	Intermediate	86	54	60
CTP-SGP-59	3/1/2004	Deep	86	80	84
CTP-SGP-60	3/5/2004	Shallow	86	25	30
CTP-SGP-60	3/5/2004	Intermediate	86	55	60
CTP-SGP-60	3/5/2004	Deep	86	80	85
CTP-SGP-61	3/3/2004	Shallow	86	25	29
CTP-SGP-61	3/3/2004	Intermediate	86	55	60
CTP-SGP-61	3/3/2004	Deep	86	80	84
CTP-SGP-62	3/5/2004	Shallow	86	24	28
CTP-SGP-62	3/5/2004	Intermediate	86	54	60
CTP-SGP-62	3/5/2004	Deep	86	79	84
MW-BW-68-A	3/1/2004	Extraction Well	92	60	90
MW-BW-69-A	3/2/2004	Extraction Well	92	60	89
MW-BW-70-A	3/1/2004	Extraction Well	92	60	90
MW-BW-62-A <sup>2</sup>	5/29/2003	Extraction Well	128	57.5	89.5
MW-BW-63-A <sup>2</sup>	6/3/2003	Extraction Well	128	57.5	87.5

<sup>1</sup>Below ground surface

<sup>2</sup>Probe is dual screened; upper screened interval is presented. The lower screened interval extends into the groundwater (approximately 98' bgs), however there is small part of this section (approximately 5-10 feet) that is above the groundwater.

**Table 5-1**  
**Preliminary Results**  
**Carbon Tetrachloride Soil Vapor Extraction System**

Location:	<b>INFLUENT</b>	<b>BETWEEN GAC BEDS</b>	<b>EFFLUENT</b>	<b>INFLUENT</b>	<b>EFFLUENT</b>	<b>INFLUENT</b>	<b>EFFLUENT</b>	<b>INFLUENT</b>	<b>EFFLUENT</b>	<b>INFLUENT</b>	<b>EFFLUENT</b>	<b>INFLUENT</b>	<b>INFLUENT</b>	<b>BETWEEN GAC BEDS</b>
Sample Number:	CTP-INF-056	CTP-MID-057	CTP-EFF-058	CTP-INF-059	CTP-EFF-060	CTP-INF-061	CTP-EFF-062	CTP-INF-063	CTP-EFF-064	CTP-INF-065	CTP-EFF-066	CTP-INF-082	CTP-INF-107	CTP-MID-108
Date Collected:	4/6/2004	4/6/2004	4/6/2004	4/7/2004	4/7/2004	4/13/2004	4/13/2004	4/16/2004	4/16/2004	4/27/2004	4/27/2004	5/18/2004	6/14/2004	6/14/2004
Sample Delivery Group:	0404115	0404115	0404115	0404178	0404178	0404236	0404236	0404344	0404344	0404552	0404552	0405368	0406376	0406376
Result Units:	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV
	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
Chloroform, (TO-15)	8.5	<0.82	<0.84	7.3	<0.76	6.8	<0.79	6.2	<0.79	4.0	<0.76	4.1	4.2	<0.80
Carbon Tetrachloride, (TO-15)	180	<0.82	<0.84	150	<0.76	110	<0.79	85	<0.79	24	<0.76	7.8	4.7	<0.80
Trichloroethene, (TO-15)	7.4	<0.82	<0.84	5.6	<0.76	4.2	<0.79	3.8	<0.79	1.0	<0.76	0.46J	0.32J	<0.80
Tetrachloroethene, (TO-15)	10	<0.82	<0.84	7.8	<0.76	6.6	<0.79	6.9	<0.79	2.5	<0.76	1.8	1.2	<0.80



**Table 5-1**  
**Preliminary Results**  
**Carbon Tetrachloride Soil Vapor Extraction System**

	<b>EFFLUENT</b>	<b>INFLUENT</b>	<b>BETWEEN GAC BEDS</b>	<b>EFFLUENT</b>	<b>INFLUENT</b>	<b>INFLUENT</b>	<b>EFFLUENT</b>	<b>INFLUENT</b>	<b>INFLUENT</b>	<b>BETWEEN GAC BEDS</b>	<b>EFFLUENT</b>
Location:	CTP-EFF-109	CTP-INF-181	CTP-MID-182	CTP-EFF-183	CTP-INF-192	CTP-INF-193	CTP-EFF-194	CTP-INF-200	CTP-INF-207	CTP-MID-208	CTP-EFF-209
Sample Number:	6/14/2004	9/9/2004	9/9/2004	9/9/2004	9/23/2004	9/23/2004	9/23/2004	10/7/2004	11/8/2004	11/8/2004	11/8/2004
Date Collected:	0406376	0409255	0409255	0409255	0409506	0409506	0409506	0410171	0411172	0411172	0411172
Sample Delivery Group:	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV
Result Units:	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
Chloroform, (TO-15)	<0.80	3.4	<0.80	<0.80	3.9	4.0	<0.80	2.7	2.1	1.0	<0.84
Carbon Tetrachloride, (TO-15)	<0.80	5.9	<0.80	<0.80	4.0	4.0	<0.80	2.1	1.9	<0.82	<0.84
Trichloroethene, (TO-15)	<0.80	0.50J	<0.80	<0.80	0.38J	<0.79	<0.80	0.14J	<0.82	<0.82	<0.84
Tetrachloroethene, (TO-15)	<0.80	1.5	<0.80	<0.80	1.3	1.2	<0.80	0.71J	0.51J	<0.82	<0.84

Table 5-2A

Preliminary Results  
Monitoring Probes  
Carbon Tetrachloride Soil Vapor Extraction System

LOCATION	CTP-SGP-35	CTP-SGP-35	CTP-SGP-37	CTP-SGP-37	CTP-SGP-37	CTP-SGP-37	CTP-SGP-48	CTP-SGP-48	CTP-SGP-48	CTP-SGP-49	CTP-SGP-49	CTP-SGP-50	CTP-SGP-50	CTP-SGP-51	CTP-SGP-51	CTP-SGP-51
SAMPLE NUMBER	CTP-35-047	CTP-35-157	CTP-37-048	CTP-37-074	CTP-37-155	CTP-37-156	CTP-48-049	CTP-48-073	CTP-48-154	CTP-49-075	CTP-49-158	CTP-50-072	CTP-50-153	CTP-51-031	CTP-51-032	CTP-51-033
SAMPLE DATE	3/31/2004	6/18/2004	3/31/2004	4/28/2004	6/18/2004	6/18/2004	3/31/2004	4/28/2004	6/18/2004	4/28/2004	6/18/2004	4/28/2004	6/18/2004	3/30/2004	3/30/2004	3/30/2004
DEPTH OF PROBE	6	6	6	6	6	6	6	6	6	6	6	6	6	30	60	85
PURPOSE	REG	REG	REG	REG	PRIMARY	FIELD DUP	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
UNITS	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV
TYPE	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW	PERIMETER	PERIMETER	PERIMETER
	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
CHLOROFORM, (TO-15)	0.44J	0.080J	1.1	0.26J	0.070J	0.068J	3.5	0.49J	0.65J	<0.79	<0.82	0.26J	0.23J	0.28J	0.63J	1
CARBON TETRACHLORIDE, (TO-15)	8.2	0.54J	13	<0.79	0.093J	0.10J	11	0.28J	0.21J	0.17J	0.22J	0.20J	0.13J	7.2	22	31
TRICHLOROETHENE, (TO-15)	<0.80	0.15J	<0.82	2.4	0.17J	0.18J	<0.84	<0.79	<0.82	<0.79	<0.82	<0.78	0.069J	<0.80	<0.82	0.41J
TETRACHLOROETHENE, (TO-15)	0.54J	0.12J	0.70J	4.0	0.035J	0.16J	0.46J	<0.79	0.064J	<0.79	0.070J	<0.78	0.079J	0.18J	0.53J	0.72J
ACETONE, (TO-15)	1.5J	--	1.4J	--	--	--	1.5J	--	--	--	--	--	--	3.7	1.5J	1.1J

Table 5-2A

Preliminary Results  
Monitoring Probes  
Carbon Tetrachloride Soil Vapor Extraction System

LOCATION:	CTP-SGP-51	CTP-SGP-51	CTP-SGP-51	CTP-SGP-51	CTP-SGP-51	CTP-SGP-52	CTP-SGP-52	CTP-SGP-52	CTP-SGP-52	CTP-SGP-52	CTP-SGP-52	CTP-SGP-52	CTP-SGP-52	CTP-SGP-52	CTP-SGP-52	CTP-SGP-52
SAMPLE NUMBER:	CTP-51-092	CTP-51-093	CTP-51-127	CTP-51-128	CTP-51-129	CTP-52-044	CTP-52-046	CTP-52-045	CTP-52-094	CTP-52-095	CTP-52-130	CTP-52-131	CTP-52-132	CTP-52-133	CTP-52-176	CTP-52-188
SAMPLE DATE:	5/18/2004	5/18/2004	6/16/2004	6/16/2004	6/16/2004	3/31/2004	3/31/2004	3/31/2004	5/19/2004	5/19/2004	6/16/2004	6/16/2004	6/16/2004	6/16/2004	9/2/2004	9/23/2004
DEPTH OF PROBE:	30	85	30	60	85	30	60	85	30	85	30	60	85	85	85	85
PURPOSE:	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	PRIMARY	FIELD DUP	REG
UNITS:	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV
TYPE:	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER
	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
CHLOROFORM, (TO-15)	0.34J	0.33J	0.17J	0.12J	0.24J	2.7	5.4	8.8	1.4	2.8	0.64J	2.2	1.9	2.0	1.8	2.1
CARBON TETRACHLORIDE, (TO-15)	0.091J	1.0	0.082J	0.084J	0.55J	39	180	290	0.43J	10	0.18J	0.68J	2.9	3.4	5.6	2.7
TRICHLOROETHENE, (TO-15)	<0.80	<0.79	<0.84	0.089J	0.15J	0.16J	0.52J	0.95	<0.80	<0.80	<0.82	0.28J	0.14J	<0.76	<0.82	<0.76
TETRACHLOROETHENE, (TO-15)	<0.80	<0.79	<0.84	0.048J	0.076J	0.95	3.1	5.2	0.21J	<0.80	0.14J	0.29J	0.28J	0.28J	0.44J	0.28J
ACETONE, (TO-15)	--	--	--	--	--	6.7	8.5	8.8	--	--	--	--	--	--	--	--

Table 5-2A

Preliminary Results  
Monitoring Probes  
Carbon Tetrachloride Soil Vapor Extraction System

LOCATION:	CTP-SGP-53	CTP-SGP-53	CTP-SGP-53	CTP-SGP-53	CTP-SGP-53	CTP-SGP-53	CTP-SGP-53	CTP-SGP-53	CTP-SGP-53	CTP-SGP-53	CTP-SGP-53	CTP-SGP-53	CTP-SGP-54	CTP-SGP-54	CTP-SGP-54	CTP-SGP-54	CTP-SGP-54
SAMPLE NUMBER:	CTP-53-040	CTP-53-041	CTP-53-042	CTP-53-043	CTP-53-090	CTP-53-091	CTP-53-134	CTP-53-135	CTP-53-136	CTP-53-175	CTP-53-187	CTP-54-037	CTP-54-038	CTP-54-039	CTP-54-088	CTP-54-089	
SAMPLE DATE:	3/31/2004	3/31/2004	3/31/2004	3/31/2004	5/18/2004	5/18/2004	6/16/2004	6/16/2004	6/16/2004	9/2/2004	9/23/2004	3/31/2004	3/31/2004	3/31/2004	5/18/2004	5/18/2004	
DEPTH OF PROBE:	30	60	85	85	30	85	30	60	85	85	85	30	60	85	30	85	
PURPOSE:	REG	REG	PRIMARY	FIELD DUP	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	
UNITS:	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	
TYPE:	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	
	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	
CHLOROFORM, (TO-15)	3.5	5.1	5	5.5	0.88	4.0	0.94	9.1	3.8	4.4	4.5	2.3	4	5	1.2	1.2	
CARBON TETRACHLORIDE, (TO-15)	24	64	70	78	0.18J	27	<0.84	0.22J	16	12	14	8.2	41	57	<0.80	3.2	
TRICHLOROETHENE, (TO-15)	0.24J	0.35J	0.19J	0.20J	<0.80	<0.80	<0.84	<0.86	<0.86	<0.80	<0.73	<0.80	<0.79	<0.80	<0.80	<0.79	
TETRACHLOROETHENE, (TO-15)	0.74J	1.7	1.8	2.1	<0.80	0.84	<0.84	<0.86	0.53J	0.49J	0.54J	1.8	3.9	4.8	0.30J	3.8	
ACETONE, (TO-15)	25	110	8.8	5.2	--	--	--	--	--	--	--	78	17	71	--	--	

Table 5-2A

Preliminary Results  
Monitoring Probes  
Carbon Tetrachloride Soil Vapor Extraction System

LOCATION:	CTP-SGP-54	CTP-SGP-54	CTP-SGP-54	CTP-SGP-55	CTP-SGP-55	CTP-SGP-55	CTP-SGP-55	CTP-SGP-55	CTP-SGP-55	CTP-SGP-55	CTP-SGP-55	CTP-SGP-55	CTP-SGP-55	CTP-SGP-55	CTP-SGP-55	CTP-SGP-55
SAMPLE NUMBER:	CTP-54-137	CTP-54-138	CTP-54-139	CTP-55-028	CTP-55-029	CTP-55-030	CTP-55-140	CTP-55-141	CTP-55-142	CTP-55-143	CTP-55-160	CTP-55-162	CTP-55-163	CTP-55-179	CTP-55-180	CTP-55-184
SAMPLE DATE:	6/16/2004	6/16/2004	6/16/2004	3/30/2004	3/30/2004	3/30/2004	6/17/2004	6/17/2004	6/17/2004	6/17/2004	7/2/2004	7/20/2004	8/4/2004	9/2/2004	9/2/2004	9/23/2004
DEPTH OF PROBE:	30	60	85	30	60	85	30	30	60	85	85	85	85	85	85	85
PURPOSE:	REG	REG	REG	REG	REG	REG	PRIMARY	FIELD DUP	REG	REG	REG	REG	REG	PRIMARY	FIELD DUP	REG
UNITS:	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV
TYPE:	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER
	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
CHLOROFORM, (TO-15)	1.1	1.6	0.86	2.6	7.6	10	0.49J	0.40J	0.77J	4.6	6.3	6.2	6.2	4.9	5.1	4.3
CARBON TETRACHLORIDE, (TO-15)	<0.82	0.22J	2.2	47	140	180	0.18J	<0.86	<0.86	24	37	37	35	25	26	20
TRICHLOROETHENE, (TO-15)	<0.82	<0.84	<0.82	0.80J	3.2	4.3	<0.84	0.56J	<0.86	0.78J	1.2	1.3	1.3	0.94	1.0	0.69J
TETRACHLOROETHENE, (TO-15)	<0.82	2.4	2.8	2.6	6.9	8.5	<0.84	<0.86	0.22J	3.1	4.3	4.5	4.8	3.5	3.5	3.4
ACETONE, (TO-15)	--	--	--	7.4	15	3.7	--	--	--	--	--	--	--	--	--	--

Table 5-2A

Preliminary Results  
Monitoring Probes  
Carbon Tetrachloride Soil Vapor Extraction System

LOCATION:	CTP-SGP-55	CTP-SGP-55	CTP-SGP-56	CTP-SGP-56	CTP-SGP-56	CTP-SGP-56	CTP-SGP-56	CTP-SGP-56	CTP-SGP-56	CTP-SGP-56	CTP-SGP-56	CTP-SGP-56	CTP-SGP-56	CTP-SGP-56	CTP-SGP-56	CTP-SGP-56	CTP-SGP-57
SAMPLE NUMBER	CTP-55-197	CTP-55-203	CTP-56-025	CTP-56-026	CTP-56-027	CTP-56-096	CTP-56-097	CTP-56-144	CTP-56-145	CTP-56-146	CTP-56-178	CTP-56-185	CTP-56-198	CTP-56-199	CTP-56-204	CTP-57-022	
SAMPLE DATE	10/7/2004	10/14/2004	3/30/2004	3/30/2004	3/30/2004	5/19/2004	5/19/2004	6/17/2004	6/17/2004	6/17/2004	9/2/2004	9/23/2004	10/7/2004	10/7/2004	10/14/2004	3/29/2004	
DEPTH OF PROBE	85	85	30	60	85	30	85	30	60	85	85	85	85	85	85	30	
PURPOSE	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	PRIMARY	FIELD DUP	FIELD DUP	REG	
UNITS	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	
TYPE	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	
	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	
CHLOROFORM, (TO-15)	1.8	3.5	0.9	2.9	3.8	5.8	3.6	0.20J	0.19J	2.1	2.0	2.0	1.8	2.8	2.2	6.6	
CARBON TETRACHLORIDE, (TO-15)	6.7	11	16	59	77	0.13J	27	<0.84	<0.84	10	9.0	9.4	6.7	9.4	7.2	5.3	
TRICHLOROETHENE, (TO-15)	<0.80	0.35J	<0.86	1.2	1.2	<0.80	2.5	<0.84	<0.84	0.33J	<0.82	0.46J	0.18J	0.33J	<0.82	<0.84	
TETRACHLOROETHENE, (TO-15)	1.1	2.7	1.4	4.6	6.4	<0.80	0.55J	<0.84	0.17J	1.3	1.4	1.3	1	2.2	1.2	5.3	
ACETONE, (TO-15)	--	--	3.4	12	6	--	--	--	--	--	--	--	--	--	--	7.5	

Table 5-2A

Preliminary Results  
Monitoring Probes  
Carbon Tetrachloride Soil Vapor Extraction System

LOCATION	CTP-SGP-57	CTP-SGP-57	CTP-SGP-57	CTP-SGP-57	CTP-SGP-57	CTP-SGP-57	CTP-SGP-57	CTP-SGP-58	CTP-SGP-58	CTP-SGP-58	CTP-SGP-58	CTP-SGP-58	CTP-SGP-58	CTP-SGP-58	CTP-SGP-58	CTP-SGP-59
SAMPLE NUMBER	CTP-57-023	CTP-57-024	CTP-57-098	CTP-57-099	CTP-57-150	CTP-57-151	CTP-57-152	CTP-58-019	CTP-58-020	CTP-58-021	CTP-58-102	CTP-58-103	CTP-58-118	CTP-58-119	CTP-58-120	CTP-59-010
SAMPLE DATE	3/29/2004	3/29/2004	5/19/2004	5/19/2004	6/17/2004	6/17/2004	6/17/2004	3/29/2004	3/29/2004	3/29/2004	5/19/2004	5/19/2004	6/15/2004	6/15/2004	6/15/2004	3/25/2004
DEPTH OF PROBE	60	85	30	85	30	60	85	30	60	85	30	85	30	60	85	30
PURPOSE	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
UNITS	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV
TYPE	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER
	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
CHLOROFORM, (TO-15)	4.6	4.2	1.1	4.2	2.1	19	3.6	0.76J	1.8	2.4	<0.78	1.0	0.83J	<0.84	0.80J	0.95
CARBON TETRACHLORIDE, (TO-15)	51	58	0.10J	4.4	0.10J	0.084J	1.6	19	35	43	0.12J	0.54J	0.090J	0.13J	0.26J	7.4
TRICHLOROETHENE, (TO-15)	0.8	1.3	<0.78	<0.80	0.12J	0.18J	0.084J	0.69J	2.1	3.3	<0.78	<0.78	<0.84	<0.84	<0.86	3.8
TETRACHLOROETHENE, (TO-15)	35	39	0.43J	36	0.37J	0.36J	24	9.6	19	26	<0.78	12	<0.84	0.63J	6.8	0.75J
ACETONE, (TO-15)	14	3.3	--	--	--	--	--	26	25	2.6J	--	--	--	--	--	30

Table 5-2A

Preliminary Results  
Monitoring Probes  
Carbon Tetrachloride Soil Vapor Extraction System

LOCATION	CTP-SGP-59	CTP-SGP-59	CTP-SGP-59	CTP-SGP-59	CTP-SGP-59	CTP-SGP-59	CTP-SGP-59	CTP-SGP-60	CTP-SGP-60	CTP-SGP-60	CTP-SGP-60	CTP-SGP-60	CTP-SGP-60	CTP-SGP-60	CTP-SGP-60	CTP-SGP-60
SAMPLE NUMBER	CTP-59-011	CTP-59-012	CTP-59-0100	CTP-59-0101	CTP-59-121	CTP-59-122	CTP-59-123	CTP-60-013	CTP-60-014	CTP-60-015	CTP-60-104	CTP-60-105	CTP-60-106	CTP-60-124	CTP-60-125	CTP-60-126
SAMPLE DATE	3/25/2004	3/25/2004	5/19/2004	5/19/2004	6/15/2004	6/15/2004	6/15/2004	3/29/2004	3/29/2004	3/29/2004	5/19/2004	5/19/2004	5/19/2004	6/15/2004	6/15/2004	6/15/2004
DEPTH OF PROBE	60	85	30	85	30	60	85	30	60	85	30	85	85	30	60	85
PURPOSE	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	PRIMARY	FIELD DUP	REG	REG	REG
UNITS	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV
TYPE	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER	PERIMETER
	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
CHLOROFORM, (TO-15)	3.2	3.9	<0.78	2.1	<0.82	0.99	1.7	0.73J	2	2.9	0.63J	0.95	1.0	0.28J	0.41J	0.66J
CARBON TETRACHLORIDE, (TO-15)	28	30	0.086J	2.7	0.12J	0.25J	1.4	10	26	35	0.20J	1.5	1.6	0.13J	0.093J	0.68J
TRICHLOROETHENE, (TO-15)	9.6	10	0.30J	2.0	<0.82	1.0	1.4	0.34J	1.5	2.6	<0.79	0.21J	0.16J	<0.84	<0.82	0.45
TETRACHLOROETHENE, (TO-15)	2.7	3.1	<0.78	0.74J	<0.82	0.22J	0.57J	0.46J	1.1	1.4	<0.79	0.54J	0.45J	<0.84	<0.82	0.15
ACETONE, (TO-15)	14	6.5	--	--	--	--	--	40	13	24	--	--	--	--	--	--



Table 5-2A

Preliminary Results  
Monitoring Probes  
Carbon Tetrachloride Soil Vapor Extraction System

LOCATION:	CTP-SGP-61	CTP-SGP-61	CTP-SGP-61	CTP-SGP-61	CTP-SGP-61	CTP-SGP-61	CTP-SGP-61	CTP-SGP-61	CTP-SGP-61	CTP-SGP-61	CTP-SGP-62	CTP-SGP-62	CTP-SGP-62	CTP-SGP-62	CTP-SGP-62	CTP-SGP-62	CTP-SGP-62
SAMPLE NUMBER:	CTP-61-016	CTP-61-017	CTP-61-018	CTP-61-076	CTP-61-077	CTP-61-078	CTP-61-115	CTP-61-116	CTP-61-117	CTP-62-034	CTP-62-035	CTP-62-036	CTP-62-079	CTP-62-080	CTP-62-081	CTP-62-147	
SAMPLE DATE:	3/29/2004	3/29/2004	3/29/2004	4/28/2004	4/28/2004	4/28/2004	6/15/2004	6/15/2004	6/15/2004	3/30/2004	3/30/2004	3/30/2004	4/28/2004	4/28/2004	4/28/2004	6/17/2004	
DEPTH OF PROBE:	30	60	85	30	60	85	30	60	85	30	60	85	30	60	85	30	
PURPOSE:	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	
UNITS:	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	
TYPE:	INTERIOR	INTERIOR	INTERIOR	INTERIOR	INTERIOR	INTERIOR	INTERIOR	INTERIOR	INTERIOR	INTERIOR	INTERIOR	INTERIOR	INTERIOR	INTERIOR	INTERIOR	INTERIOR	
	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	
CHLOROFORM, (TO-15)	1.1	9.8	8.2	4.7	0.48J	2.4	0.40J	0.37J	0.15J	6.2	10	11	0.36J	3.5	8.6	0.61J	
CARBON TETRACHLORIDE, (TO-15)	26	200	180	11	0.46J	1.7	0.12J	0.32J	0.20J	67	230	260	0.44J	1.2	31	0.27J	
TRICHLOROETHENE, (TO-15)	0.93	13	11	2.8	<0.80	0.65J	0.32J	<0.84	<0.84	0.56J	3.7	5.2	<0.80	<0.82	1.4	0.071J	
TETRACHLOROETHENE, (TO-15)	2.6	16	14	9.4	0.26J	1.9	<0.84	1.1	0.20J	2.4	7	8	0.40J	0.68J	2.8	0.19J	
ACETONE, (TO-15)	6.1	56	15	--	--	--	--	--	--	2.7J	21	4.7	--	--	--	--	

Table 5-2A

Preliminary Results  
Monitoring Probes  
Carbon Tetrachloride Soil Vapor Extraction System

LOCATION	CTP-SGP-62	CTP-SGP-62	CTP-SGP-62	CTP-SGP-62	CTP-SGP-62	CTP-SGP-62	CTP-SGP-62	CTP-SGP-63	CTP-SGP-63	CTP-SGP-63	CTP-SGP-63	CTP-SGP-63	CTP-SGP-63	CTP-SGP-63	CTP-SGP-63	CTP-SGP-64	CTP-SGP-64
SAMPLE NUMBER	CTP-62-148	CTP-62-149	CTP-62-159	CTP-62-161	CTP-62-164	CTP-62-177	CTP-62-186	CTP-63-172	CTP-63-173	CTP-63-174	CTP-63-189	CTP-63-195	CTP-63-201	CTP-63-205	CTP-64-165	CTP-64-166	
SAMPLE DATE	6/17/2004	6/17/2004	7/2/2004	7/20/2004	8/4/2004	9/2/2004	9/23/2004	9/2/2004	9/2/2004	9/2/2004	9/23/2004	10/7/2004	10/14/2004	10/22/2004	9/1/2004	9/1/2004	
DEPTH OF PROBE	60	85	85	85	85	85	85	30	60	85	85	85	85	85	30	60	
PURPOSE	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	
UNITS	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	
TYPE	INTERIOR	INTERIOR	INTERIOR	INTERIOR	INTERIOR	INTERIOR	INTERIOR	NEW PROBE	NEW PROBE	NEW PROBE	NEW PROBE	NEW PROBE	NEW PROBE	NEW PROBE	NEW PROBE	NEW PROBE	
	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	
CHLOROFORM, (TO-15)	0.81J	1.2	1.7	2.3	2.8	2.9	2.5	0.12J	0.24J	0.98	1.4	1.1	1.2	1	0.19J	0.14J	
CARBON TETRACHLORIDE, (TO-15)	0.35J	0.63J	3.5	7.6	10	11	0.68J	1.1	3.1	33	42	29	34	26	0.36J	1.8	
TRICHLOROETHENE, (TO-15)	0.098J	0.39J	0.46J	0.44J	<0.74	0.78J	<0.76	<0.79	<0.80	0.38J	0.64J	0.38J	0.54J	0.43J	<0.76	0.17J	
TETRACHLOROETHENE, (TO-15)	0.26J	0.40J	0.51J	0.70J	1.1	0.90	0.37J	<0.79	<0.80	0.49J	0.71J	0.48J	0.63J	0.47J	<0.76	<0.79	
ACETONE, (TO-15)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Table 5-2B

Preliminary Results  
Extraction Wells  
Carbon Tetrachloride Soil Vapor Extraction System

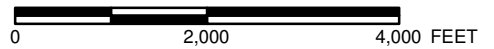
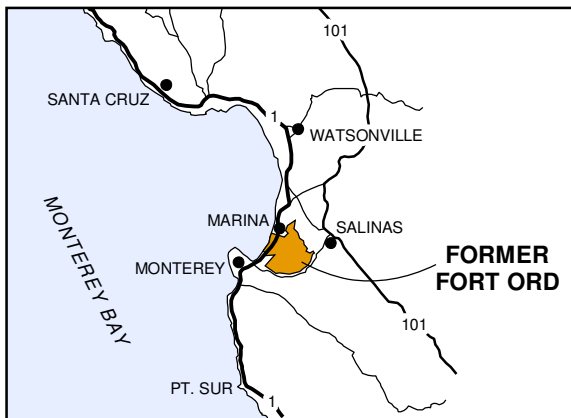
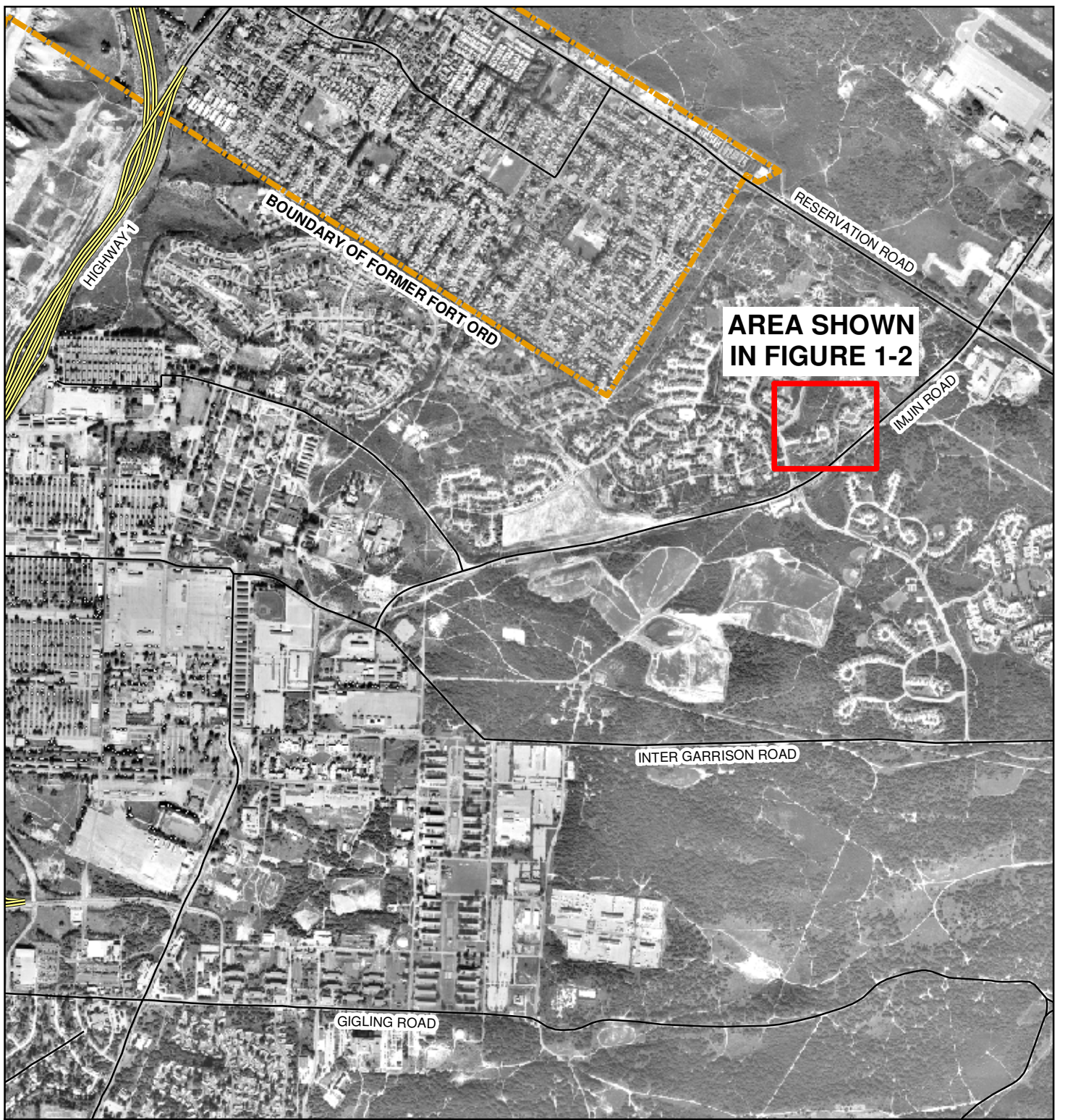
LOCATION	MW-BW-62-A	MW-BW-62-A	MW-BW-62-A	MW-BW-62-A	MW-BW-62-A	MW-BW-63-A	MW-BW-63-A	MW-BW-63-A	MW-BW-63-A	MW-BW-63-A	MW-BW-63-A	MW-BW-68-A	MW-BW-68-A	MW-BW-68-A
SAMPLE NUMBER	CTP-MW-62-050	CTP-MW-62-067	CTP-MW-62-083	CTP-MW-62-110	CTP-MW-62-210	CTP-MW-63-052	CTP-MW-63-053	CTP-MW-63-069	CTP-MW-63-085	CTP-MW-63-112	CTP-MW-63-212	CTP-MW-68-054	CTP-MW-68-070	CTP-MW-68-086
SAMPLE DATE	4/1/2004	4/28/2004	5/18/2004	6/14/2004	11/8/2004	4/1/2004	4/1/2004	4/28/2004	5/18/2004	6/14/2004	11/8/2004	4/1/2004	4/28/2004	5/18/2004
DEPTH OF PROBE	92	92	92	92	92	92	92	92	92	92	92	92	92	92
PURPOSE	REG	REG	REG	REG	REG	PRIMARY	FIELD DUP	REG	REG	REG	REG	REG	REG	REG
UNITS	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV
TYPE	EXTRACTION WELL	EXTRACTION WELL	EXTRACTION WELL	EXTRACTION WELL	EXTRACTION WELL	EXTRACTION WELL	EXTRACTION WELL	EXTRACTION WELL	EXTRACTION WELL	EXTRACTION WELL	EXTRACTION WELL	EXTRACTION WELL	EXTRACTION WELL	EXTRACTION WELL
	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
CHLOROFORM, (TO-15)	6.2	3.9	4.1	4.1	0.69J	7.7	8.2	8.2	8.4	9.1	1.9	2.8	2.7	2.1
CARBON TETRACHLORIDE, (TO-15)	140	20	7.5	4.9	<-0.82	200	210	38	14	10	0.72J	120	21	5.9
TRICHLOROETHENE, (TO-15)	4.7	0.98	0.58J	0.31J	0.17J	7.4	7.4	0.48J	0.30J	0.78J	<-0.82	0.88	0.52J	<-0.79
TETRACHLOROETHENE, (TO-15)	7.4	2.5	2.3	2.7	0.27J	14	14	2.3	1.5	1.1	1.3	2.7	1.0	0.44J
ACETONE, (TO-15)	10	--	--	--	--	17	21	--	--	--	--	15	--	--

Table 5-2B

Preliminary Results  
 Extraction Wells  
 Carbon Tetrachloride Soil Vapor Extraction System

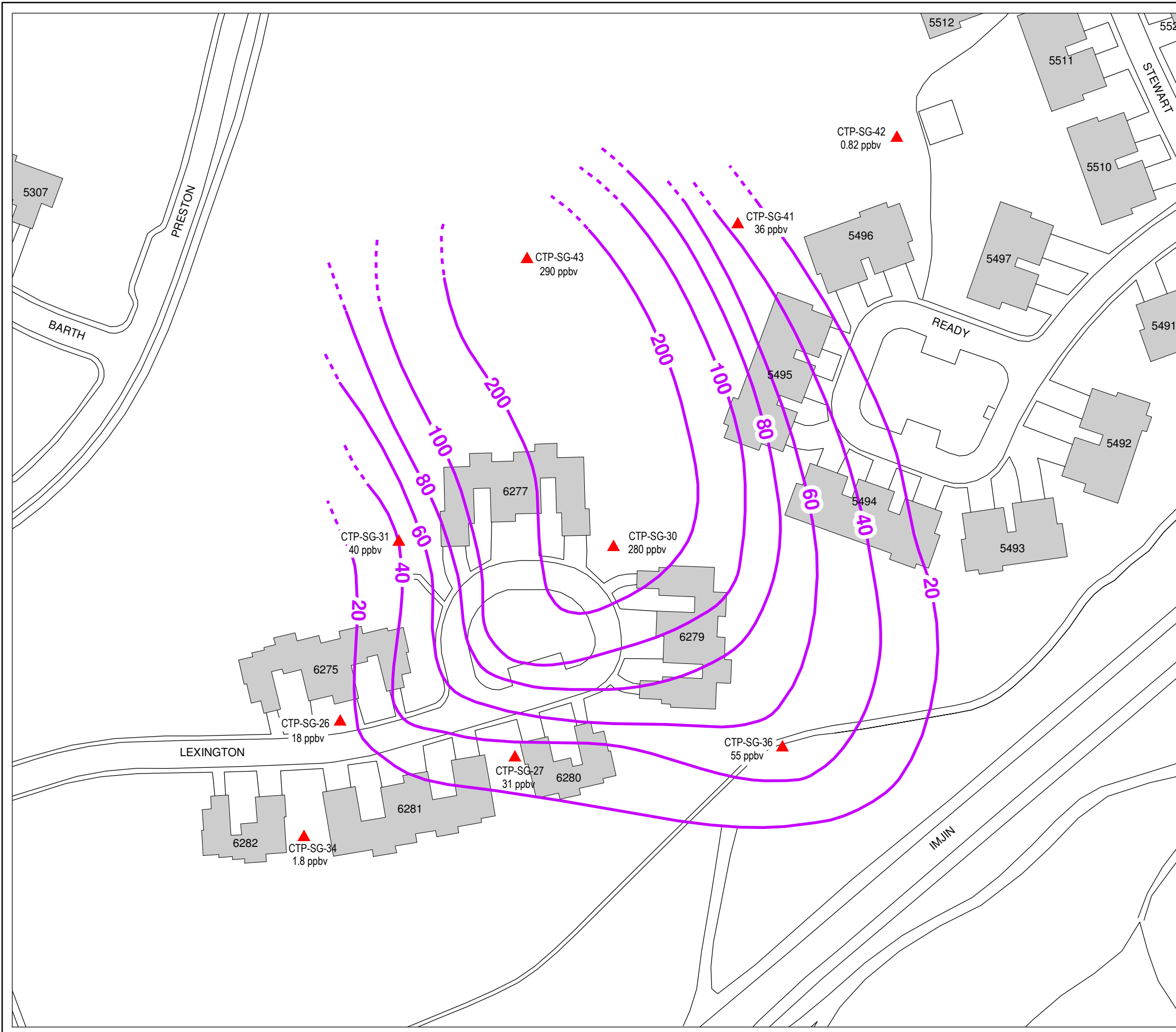
LOCATION	MW-BW-68-A	MW-BW-68-A	MW-BW-69-A	MW-BW-69-A	MW-BW-69-A	MW-BW-69-A	MW-BW-69-A	MW-BW-69-A	MW-BW-70-A	MW-BW-70-A	MW-BW-70-A	MW-BW-70-A	MW-BW-70-A
SAMPLE NUMBER	CTP-MW-68-113	CTP-MW-68-213	CTP-MW-69-055	CTP-MW-69-071	CTP-MW-69-087	CTP-MW-69-114	CTP-MW-69-214	CTP-MW-70-051	CTP-MW-70-068	CTP-MW-70-084	CTP-MW-70-111	CTP-MW-70-211	
SAMPLE DATE	6/14/2004	11/8/2004	4/1/2004	4/28/2004	5/18/2004	6/14/2004	11/8/2004	4/1/2004	4/28/2004	5/18/2004	6/14/2004	11/8/2004	
DEPTH OF PROBE	92	92	92	92	92	92	92	92	92	92	92	92	
PURPOSE	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	
UNITS	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	PPBV	
TYPE	EXTRACTION WELL	EXTRACTION WELL	EXTRACTION WELL	EXTRACTION WELL	EXTRACTION WELL	EXTRACTION WELL	EXTRACTION WELL	EXTRACTION WELL	EXTRACTION WELL	EXTRACTION WELL	EXTRACTION WELL	EXTRACTION WELL	
	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	
CHLOROFORM, (TO-15)	1.9	3.9	10	9.5	12	12	5.0	2.4	4.2	5	5.2	2.6	
CARBON TETRACHLORIDE, (TO-15)	3.7	3.6	190	31	9.5	7.2	0.86	84	15	3.1	1.9	<0.80	
TRICHLOROETHENE, (TO-15)	<0.76	<0.80	0.73	0.41J	<0.80	<0.76	<0.84	2	0.93	<0.82	<0.78	<0.80	
TETRACHLOROETHENE, (TO-15)	0.26J	0.58J	5	2.1	1.0	1.7	0.32J	18	8.5	6.4	3.8	1.0	
ACETONE, (TO-15)	--	--	40	--	--	--	--	20	--	--	--	--	

## *Figures*



REVISION	DATE	DESCRIPTION	CHKD	APPR
		Department of the Army Sacramento District, Corps of Engineers Sacramento, California		
DESIGNED: P. KELSALL		<b>FIGURE 1-1</b> <b>LOCATION MAP</b> <b>SVE PILOT TEST</b> <b>OPERABLE UNIT CARBON TETRACHLORIDE</b> <b>FORMER FORT ORD, CALIFORNIA</b>		
DRAWN: K. BLACK				
CHECKED: P. KELSALL				
SUBMITTED: _____ DATE _____		SCALE: SHEET _____	SPEC. No. FILE No. CTP Location.mxd	

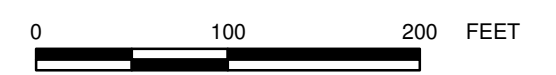




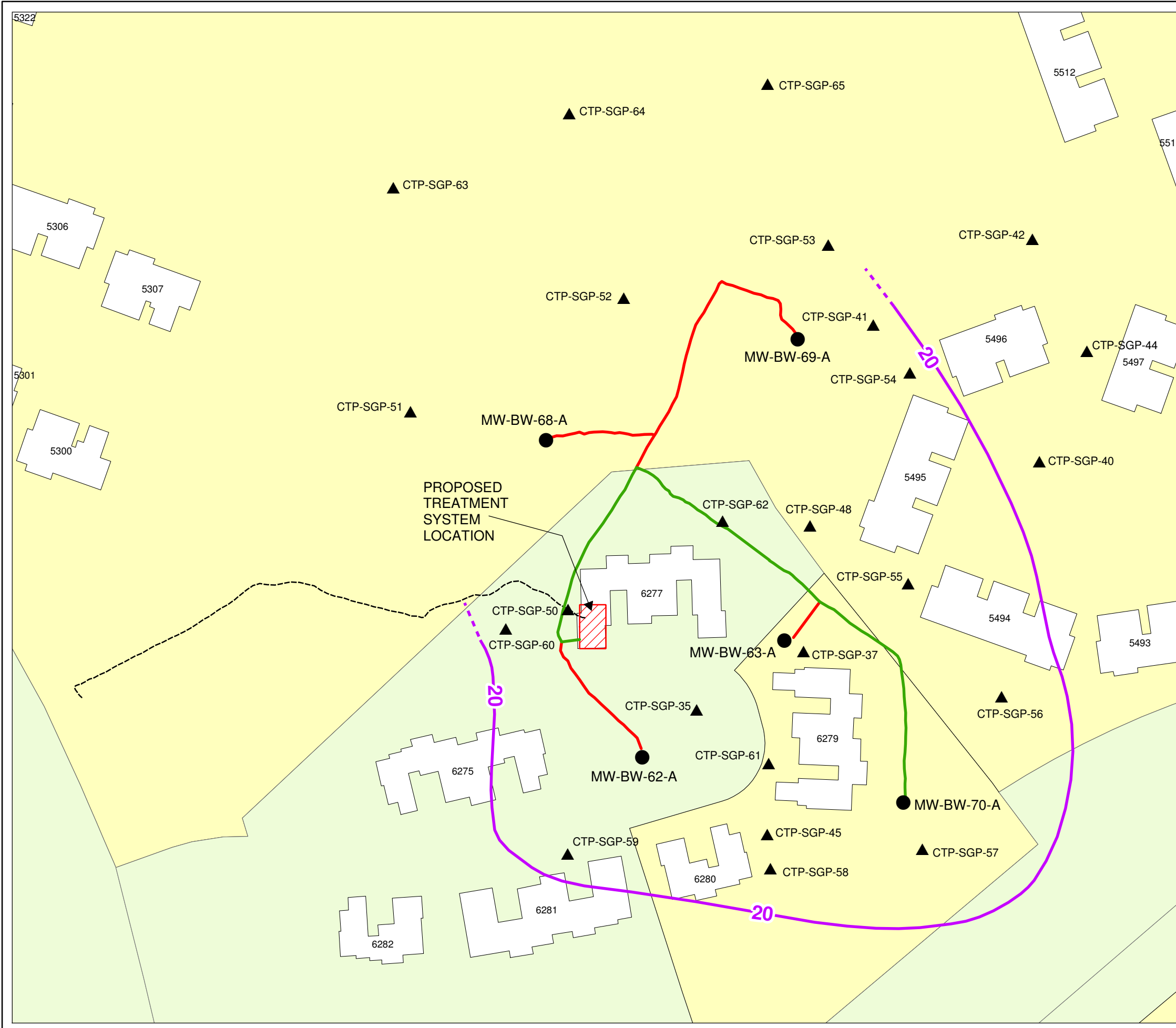
**LEGEND**

- ▲ SOIL GAS SAMPLE LOCATION
- CTP-SG-36 SAMPLE DESIGNATION
- 55 A ppbv CONCENTRATION
- CARBON TETRACHLORIDE CONCENTRATION CONTOURS AT 66-FT. DEPTH (ppbv); DASHED WHERE INFERRED
- BUILDING

NOTE:  
Carbon tetrachloride concentrations at depths below 66 ft., March to May 2003. Contours from Mactec. See Mactec 2004 for concentrations at shallower depths.



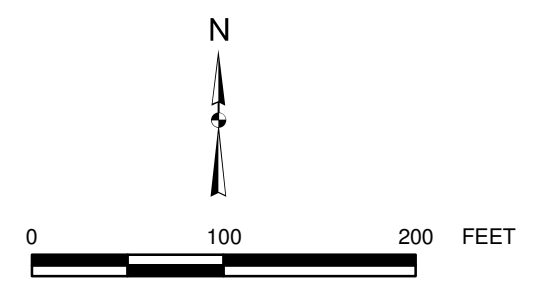
REVISION	DATE	DESCRIPTION	CHKD	APPR
		Department of the Army Sacramento District, Corps of Engineers Sacramento, California		
DESIGNED: E. SCHMIDT		<b>FIGURE 1-2</b> <b>CARBON TETRACHLORIDE CONCENTRATIONS</b> <b>IN SOIL GAS AT 66-FT. DEPTH PRIOR TO</b> <b>SVE OPERATION, SVE PILOT TEST</b> <b>OPERABLE UNIT CARBON TETRACHLORIDE</b> <b>FORMER FORT ORD, CALIFORNIA</b>		
DRAWN: K. BLACK				
CHECKED: P. KELSALL				
SUBMITTED:		SCALE:	SPEC. No.	
		SHEET	FILE No. CT_contours_66ft.mxd	



**LEGEND**

- SOIL VAPOR EXTRACTION WELL
- ▲ SOIL VAPOR MONITORING PROBE
- CARBON TETRACHLORIDE CONCENTRATION CONTOURS AT 66 FT. DEPTH (ppbv); DASHED WHERE INFERRED
- 4-INCH HDPE PIPE
- 6-INCH HDPE PIPE
- ELECTRICAL CONDUIT
- ▨ TREATMENT SYSTEM
- PARCEL TRANSFER STATUS
- NOT STARTED
- TRANSFERRED
- BUILDING

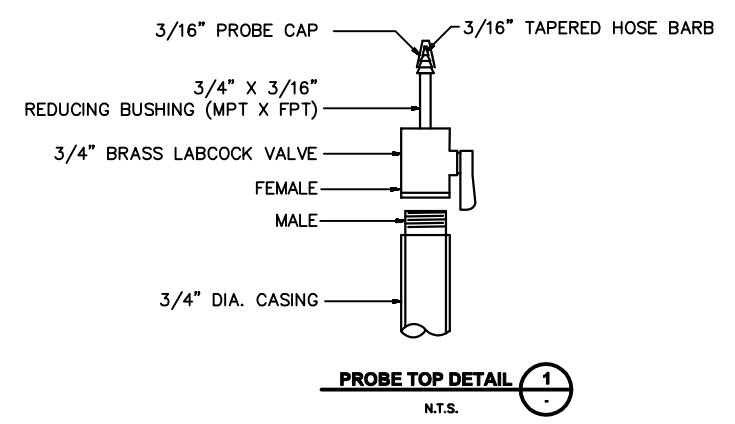
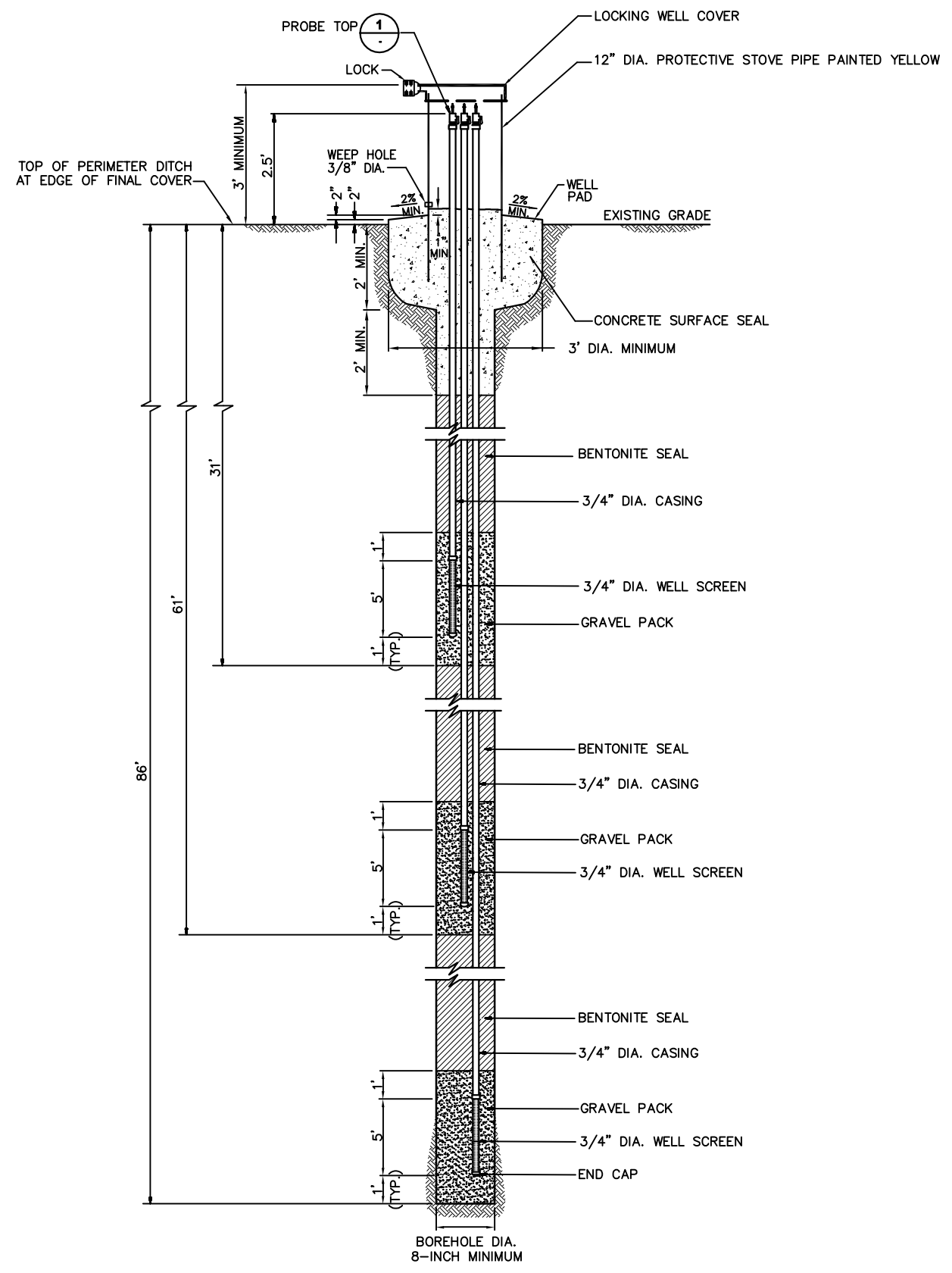
NOTE:  
CARBON TETRACHLORIDE CONCENTRATIONS  
MEASURED MARCH TO JULY 2003.



REVISION	DATE	DESCRIPTION	CHKD	APPR
		Department of the Army Sacramento District, Corps of Engineers Sacramento, California		
DESIGNED: J. PIETZ	<b>FIGURE 2-1</b> SVE COMPONENTS AND LOCATIONS SVE PILOT TEST OPERABLE UNIT CARBON TETRACHLORIDE FORMER FORT ORD, CALIFORNIA			
DRAWN: K. BLACK				
CHECKED: P. KELSALL				
SUBMITTED:	DATE	SCALE:	FILE No.	SPEC. No.
		SHEET	FILE No. SVEcomponent.mxd	







REVISION	DATE	DESCRIPTION	CHKD	APPR
		DEPARTMENT OF THE ARMY SACRAMENTO DISTRICT, CORPS OF ENGINEERS SACRAMENTO, CALIFORNIA		
DESIGNED:	<b>FIGURE 2-3</b> <b>MONITORING PROBE DETAIL</b> <b>SVE PILOT TEST</b> <b>OPERABLE UNIT CARBON TETRACHLORIDE</b> <b>FORMER FORT ORD, CALIFORNIA</b>			
T. COTA				
DRAWN:				
K. BLACK				
CHECKED:				
P. KELSALL				
SUBMITTED:	DATE APPROVED:	SCALE:	SPEC. No.	
		SHEET	FILE No.	
			783751SJ-B72	

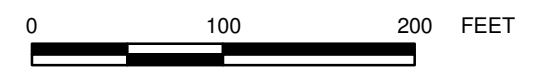


**LEGEND**

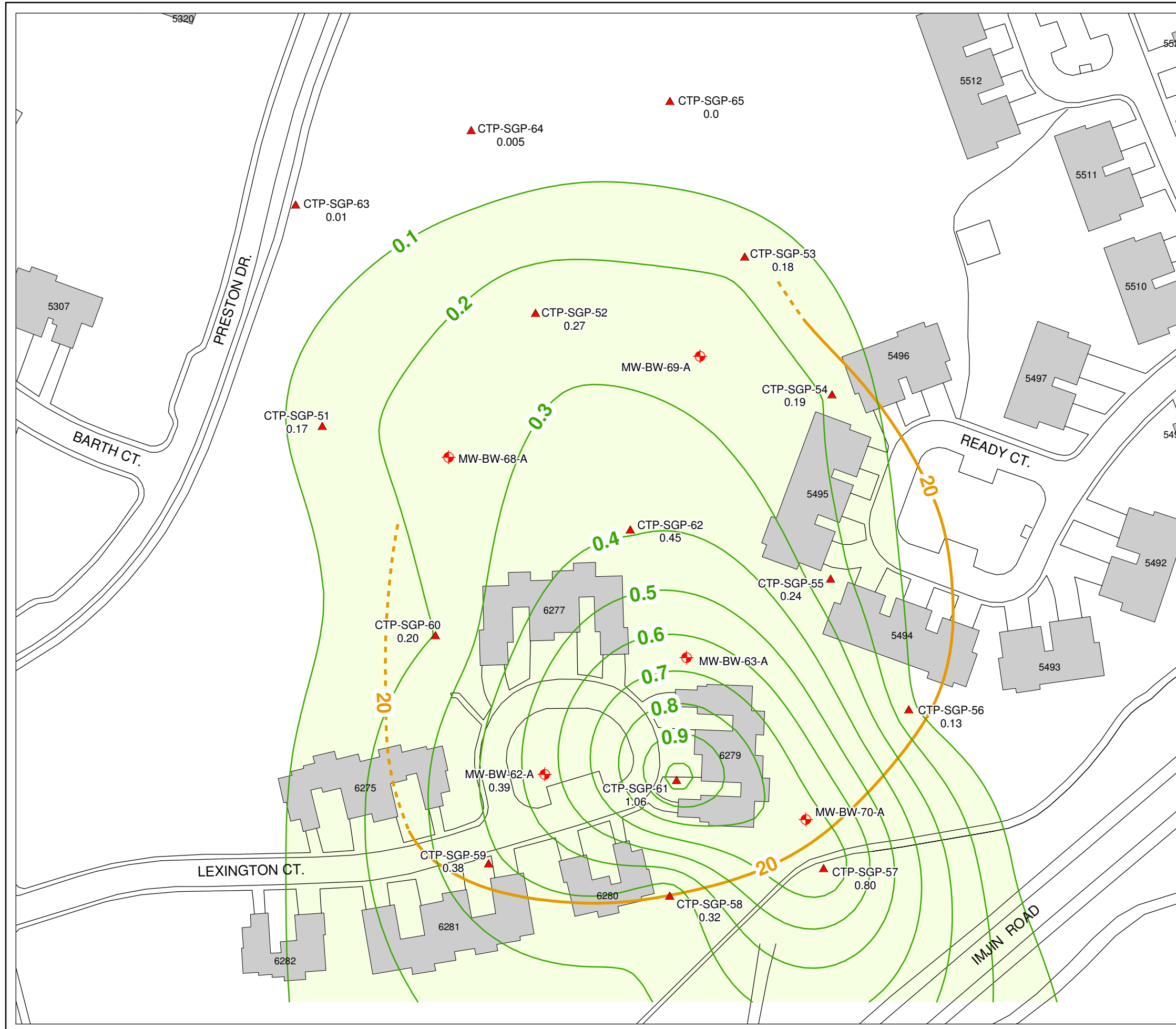
- SVE WELL
- MONITORING PROBE
- 8.2 VACUUM (INCHES H<sub>2</sub>O); MEASURED 9/14/04
- VACUUM CONTOUR (INCHES H<sub>2</sub>O)
- EFFECTIVE SVE REMEDIATION AREA
- CARBON TETRACHLORIDE CONCENTRATION CONTOURS BELOW 66 FT. DEPTH (ppbv) PRIOR TO SVE OPERATION; DASHED WHERE INFERRED
- BUILDING

**NOTES:**

1. Carbon Tetrachloride concentration contours provided by Mactec and based on data collected March to July 2003.



REVISION	DATE	DESCRIPTION	CHKD	APPR
Shaw Environmental, Inc.		Department of the Army Sacramento District, Corps of Engineers Sacramento, California		
DESIGNED: T. COTA		<b>FIGURE 3-1</b> <b>DEEP VACUUM CONTOURS (80-85 FT.)</b> <b>SVE PILOT TEST</b> <b>OPERABLE UNIT CARBON TETRACHLORIDE</b> <b>FORMER FORT ORD, CALIFORNIA</b>		
DRAWN: K. BLACK				
CHECKED: P. KELSALL				
SUBMITTED: _____				
DATE _____		SCALE: _____	SPEC. No. _____	
SHEET _____		FILE No. Vacuum_Deep_9-04.mxd		



**LEGEND**

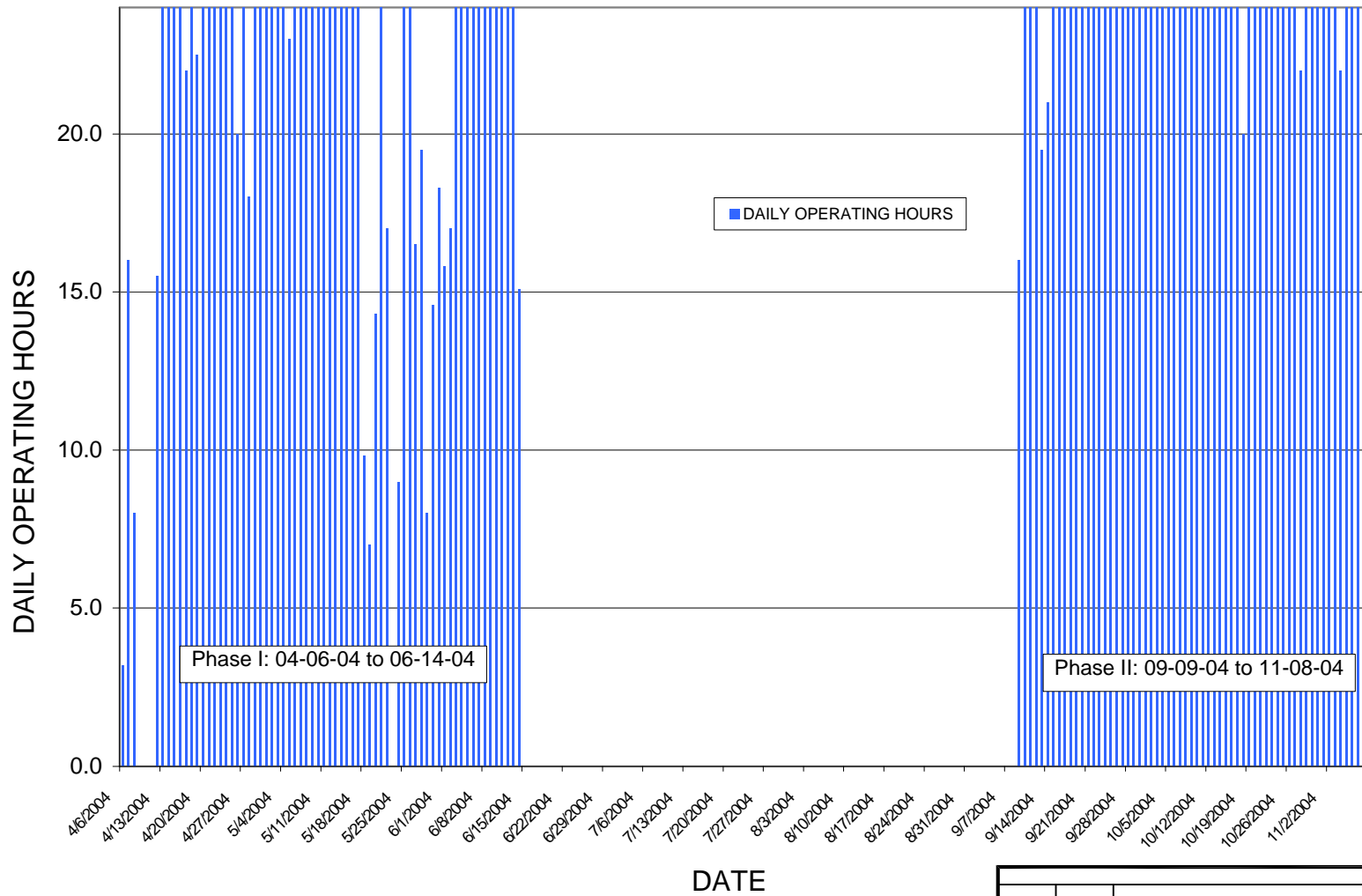
- SVE WELL
- MONITORING PROBE
- 1.06 VACUUM (INCHES H<sub>2</sub>O); MEASURED 9/14/04
- VACUUM CONTOUR (INCHES H<sub>2</sub>O)
- EFFECTIVE SVE REMEDIATION AREA
- CARBON TETRACHLORIDE CONCENTRATION CONTOURS BETWEEN 55-66 FT. DEPTH (ppbv) PRIOR TO SVE OPERATION; DASHED WHERE INFERRED
- BUILDING


**NOTES:**

1. Carbon Tetrachloride concentration contours provided by Mactec and based on data collected March to July 2003.

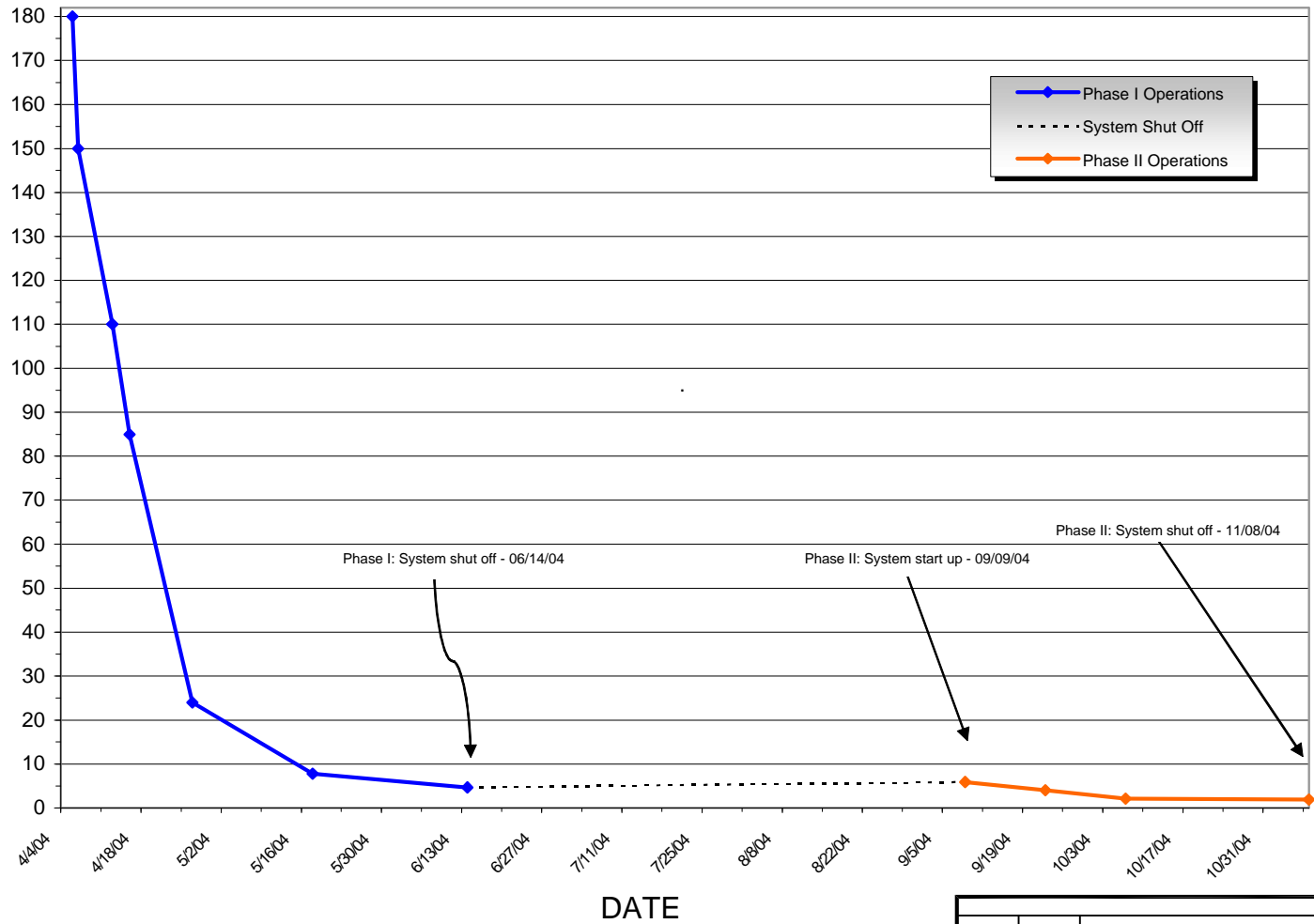


REVISION	DATE	DESCRIPTION	CHKD	APPR
Shaw Environmental, Inc.		Department of the Army Sacramento District, Corps of Engineers Sacramento, California		
DESIGNED: T. COTA	<b>FIGURE 3-2</b> <b>INTERMEDIATE VACUUM CONTOURS (55-60 FT.)</b> <b>SVE PILOT TEST</b> <b>OPERABLE UNIT CARBON TETRACHLORIDE</b> <b>FORMER FORT ORD, CALIFORNIA</b>			
DRAWN: K. BLACK				
CHECKED: P. KELSALL				
SUBMITTED:	DATE	SCALE:	SPEC. No.	
		SHEET	FILE No. Vacuum Inter_9-04.mxd	



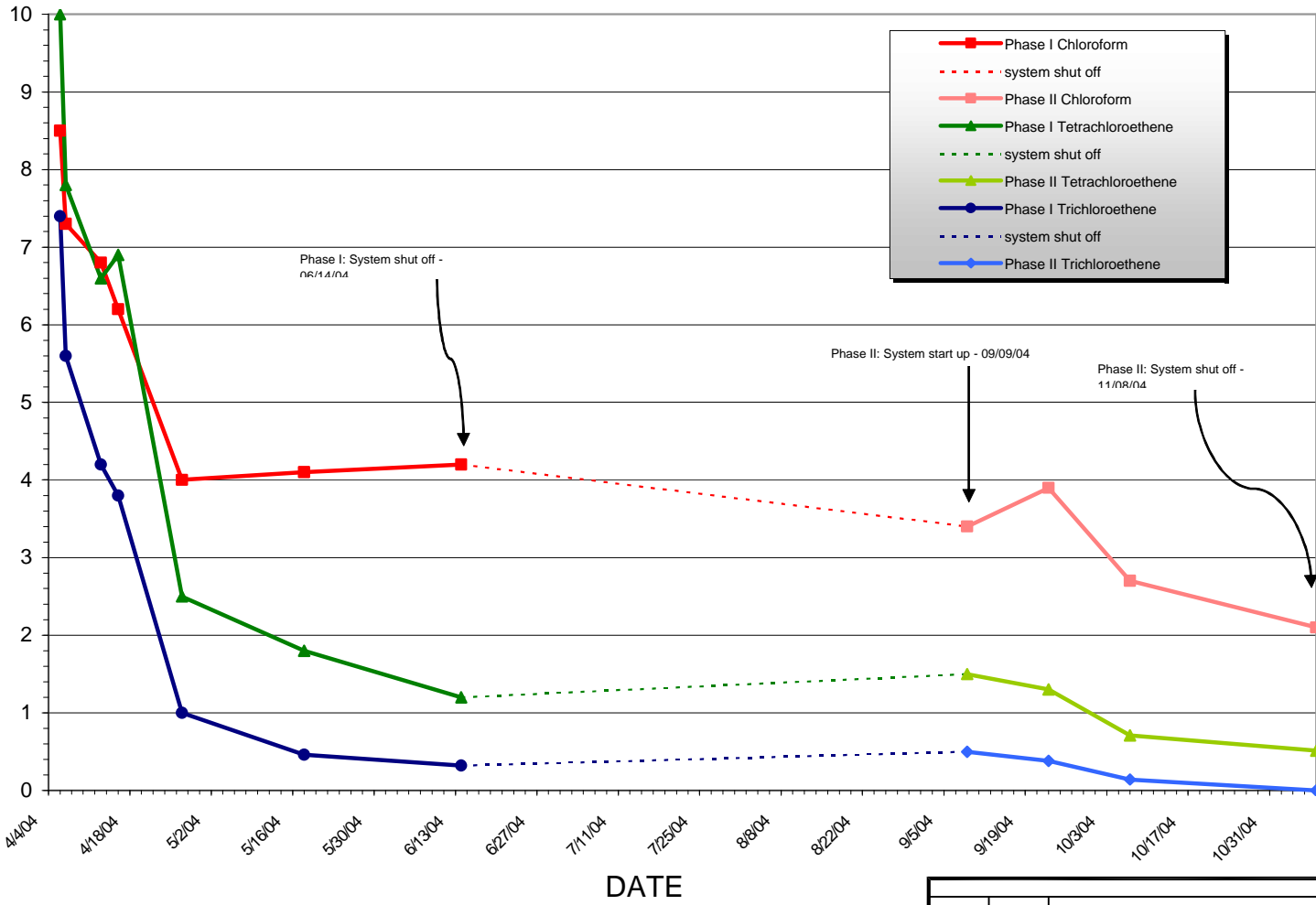
A	11/17/04	CT SVE REPORT		ES	PK
REVISION	DATE	DESCRIPTION		CHKD	APPR
			DEPARTMENT OF THE ARMY SACRAMENTO DISTRICT, CORPS OF ENGINEERS SACRAMENTO, CALIFORNIA		
DESIGNED:	FIGURE 4-1 OPERATING HISTORY SVE PILOT TEST OPERABLE UNIT CARBON TETRACHLORIDE FORMER FORT ORD, CALIFORNIA				
E. SCHMIDT					
DRAWN:					
K. BLACK					
CHECKED:					
P. KELSALL					
SUBMITTED:	DATE APPROVED:	SCALE:	SPEC. No.		
		SHEET	FILE No.		
		-	783751SJ-A169		

INFLUENT CARBON TETRACHLORIDE CONCENTRATION (ppbv)



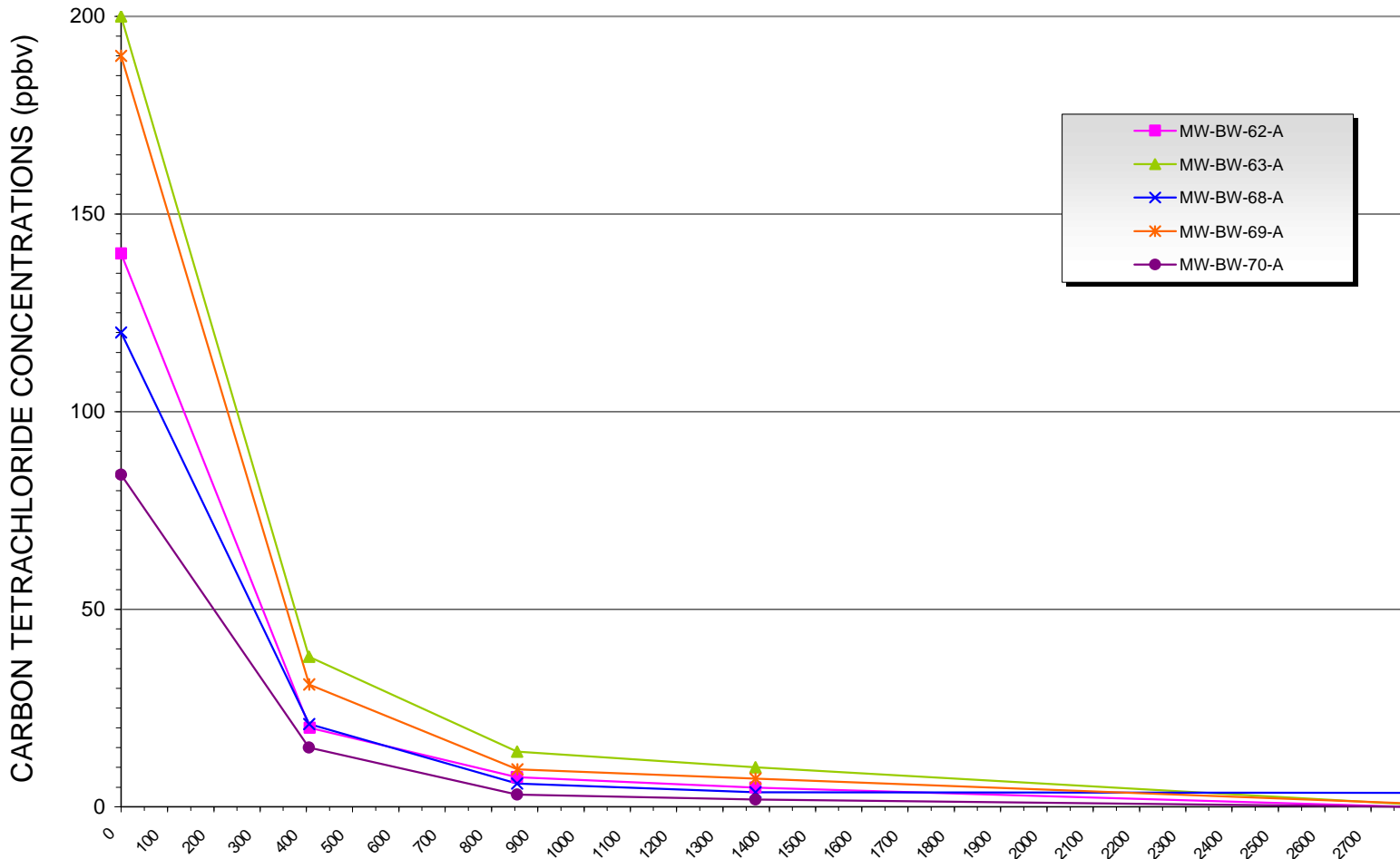
REVISION	DATE	DESCRIPTION	CHKD	APPR
A	11/17/04	CT SVE REPORT	ES	PK
DESIGNED:		DEPARTMENT OF THE ARMY SACRAMENTO DISTRICT, CORPS OF ENGINEERS SACRAMENTO, CALIFORNIA  FIGURE 5-1 INFLUENT CARBON TETRACHLORIDE CONCENTRATION vs. TIME SVE PILOT TEST OPERABLE UNIT CARBON TETRACHLORIDE FORMER FORT ORD, CALIFORNIA		
DRAWN:				
CHECKED:				
SUBMITTED:				
DATE APPROVED:				
			-	783751SJ-A170

INFLUENT VOLATILE ORGANIC COMPOUNDS CONCENTRATIONS (ppbv)



A	11/17/04	CT SVE REPORT	ES	PK
REVISION	DATE	DESCRIPTION	CHKD	APPR
		DEPARTMENT OF THE ARMY SACRAMENTO DISTRICT, CORPS OF ENGINEERS SACRAMENTO, CALIFORNIA		
DESIGNED: E. SCHMIDT		FIGURE 5-2 INFLUENT VOLATILE ORGANIC COMPOUND CONCENTRATION vs. TIME SVE PILOT TEST OPERABLE UNIT CARBON TETRACHLORIDE FORMER FORT ORD, CALIFORNIA		
DRAWN: K. BLACK				
CHECKED: P. KELSALL				
SUBMITTED:				
DATE APPROVED:		SCALE:	SPEC. No.	
SHEET:		FILE No.	783751SJ-A171	

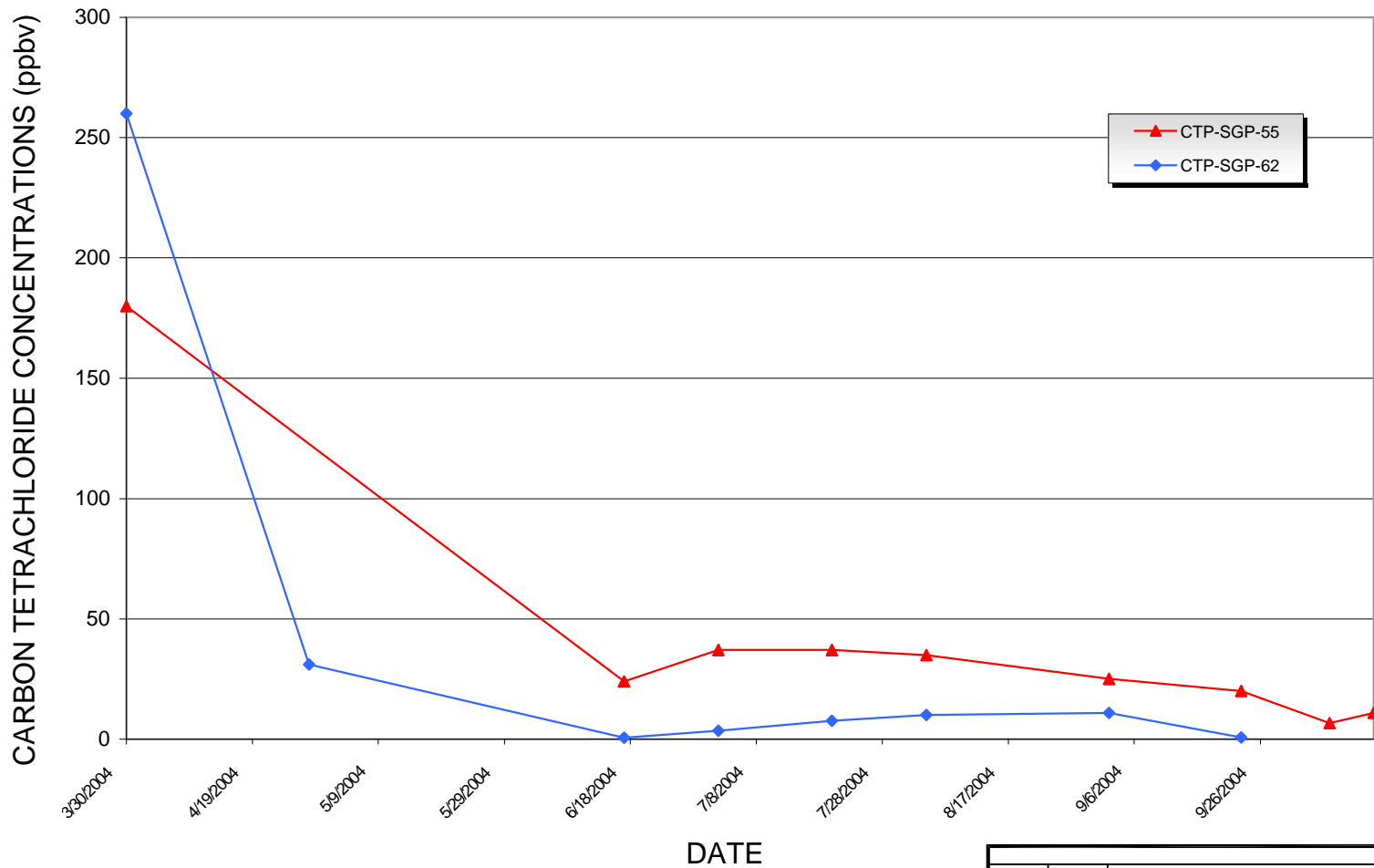





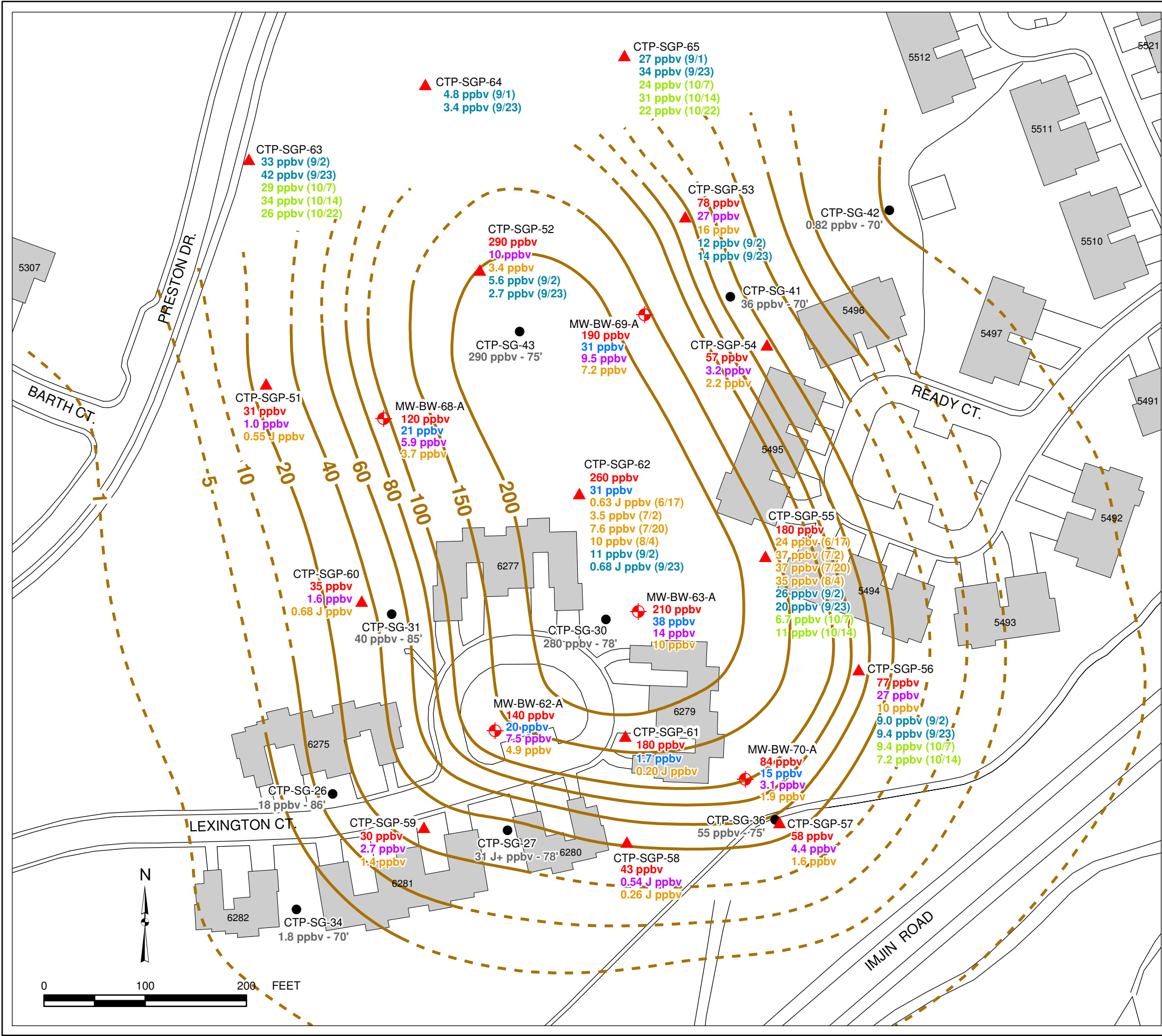
TOTAL CUMULATIVE OPERATION TIME (hours)

A		11/17/04	CT SVE REPORT	ES	PK
REVISION	DATE	DESCRIPTION		CHKD	APPR
			DEPARTMENT OF THE ARMY SACRAMENTO DISTRICT, CORPS OF ENGINEERS SACRAMENTO, CALIFORNIA		
DESIGNED:	FIGURE 5-3				
E. SCHMIDT	EXTRACTION WELL CARBON TETRACHLORIDE				
DRAWN:	CONCENTRATION vs. TIME				
K. BLACK	SVE PILOT TEST				
CHECKED:	OPERABLE UNIT CARBON TETRACHLORIDE				
P. KELSALL	FORMER FORT ORD, CALIFORNIA				
SUBMITTED:	DATE APPROVED:	SCALE:	SPEC. No.		
		SHEET	FILE No.		
		-	783751SJ-A172		





REVISION	DATE	DESCRIPTION	CHKD	APPR
A	11/17/04	CT SVE REPORT	ES	PK
		DEPARTMENT OF THE ARMY SACRAMENTO DISTRICT, CORPS OF ENGINEERS SACRAMENTO, CALIFORNIA		
DESIGNED:	FIGURE 5-4 CARBON TETRACHLORIDE CONCENTRATIONS IN SELECTED MONITORING PROBES vs. TIME SVE PILOT TEST OPERABLE UNIT CARBON TETRACHLORIDE FORMER FORT ORD, CALIFORNIA			
E. SCHMIDT				
DRAWN:				
K. BLACK				
CHECKED:				
P. KELSALL				
SUBMITTED:	DATE APPROVED:	SCALE:	SPEC. No.	
		SHEET	FILE No.	
		-	783751SJ-A173	

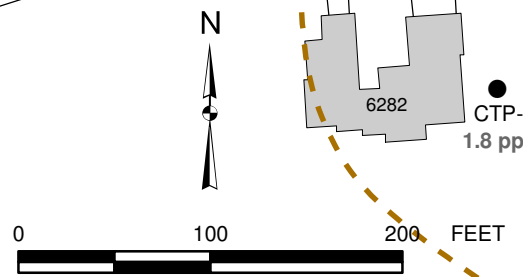


**LEGEND**

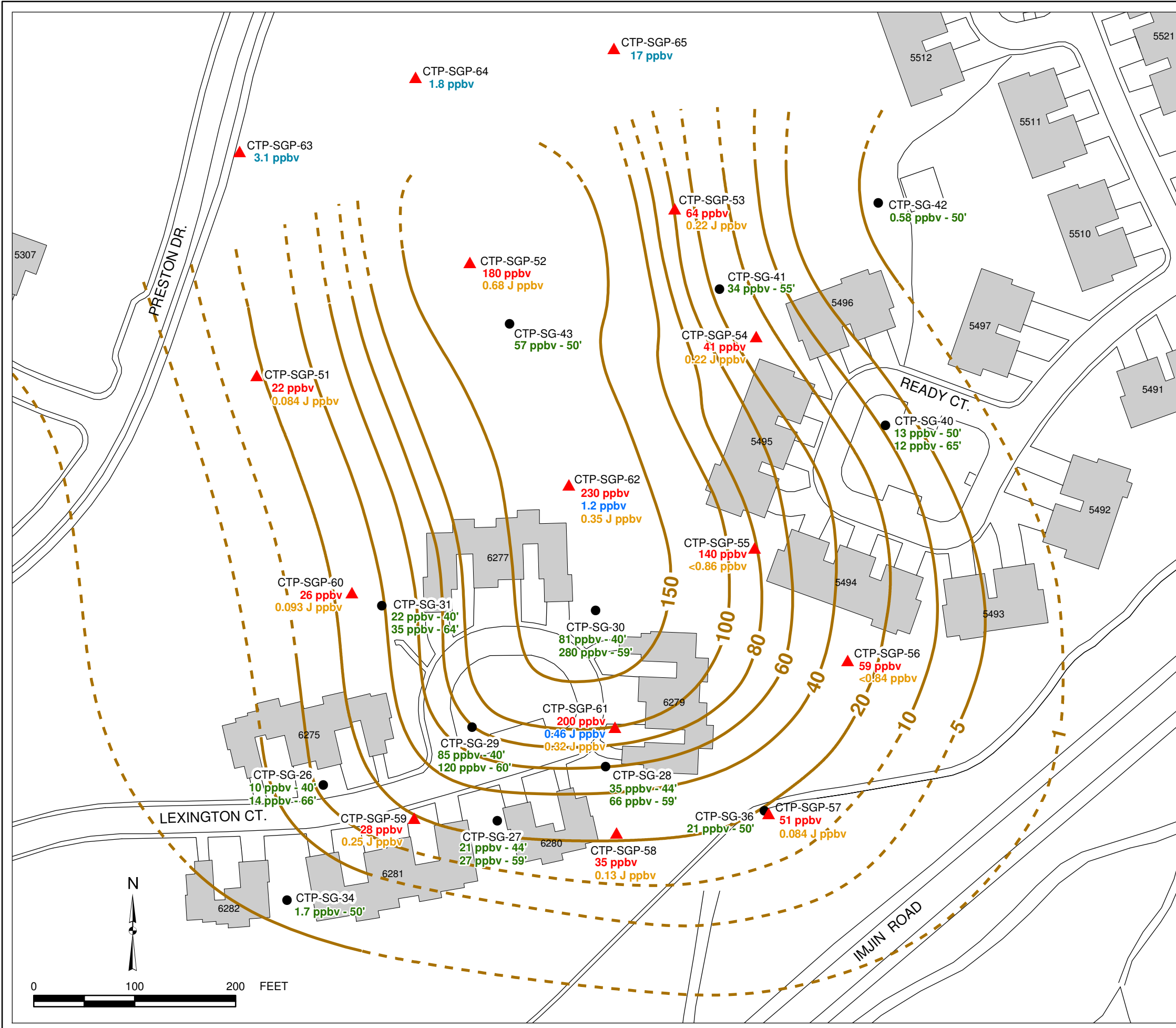
- SOIL VAPOR EXTRACTION WELL
- DEEP (80-85 FT.) MONITORING PROBE
- TEMPORARY SOIL GAS MONITORING PROBE SAMPLED MARCH TO JUNE 2003
- 280 ppbv - 78' CARBON TETRACHLORIDE CONCENTRATION MARCH-JUNE 2003; DEPTH OF PROBE SHOWN
- 210 ppbv CARBON TETRACHLORIDE CONCENTRATION - MARCH 2004
- 38 ppbv CARBON TETRACHLORIDE CONCENTRATION - APRIL 2004
- 14 ppbv CARBON TETRACHLORIDE CONCENTRATION - MAY 2004
- 14 ppbv CARBON TETRACHLORIDE CONCENTRATION JUNE-AUGUST 2004
- 5.6 ppbv CARBON TETRACHLORIDE CONCENTRATION SEPTEMBER 2004
- 6.7 ppbv CARBON TETRACHLORIDE CONCENTRATION OCTOBER 2004
- CARBON TETRACHLORIDE CONCENTRATION CONTOURS AT 85 FT. DEPTH (ppbv) PRIOR TO SVE OPERATION; DASHED WHERE INFERRED
- BUILDING

**NOTES:**

1. March Carbon Tetrachloride concentrations measured between 3/29/04 and 4/1/04, before SVE operation.
2. April Carbon Tetrachloride concentrations measured 4/28/04.
3. May Carbon Tetrachloride concentrations measured 5/18/04.
4. June-August Carbon Tetrachloride concentrations measured 6/14, 6/17, 7/2, 7/20, and 8/4/04.
5. September Carbon Tetrachloride concentrations measured 9/2/04 and 9/23/04.
6. October Carbon Tetrachloride concentrations measured 10/7/04, 10/14/04, and 10/22/04.
7. J is a laboratory qualifier (estimated value).
8. Phase I SVE operation April 6 to June 14, 2004; Phase II Sept. 9 to \_\_\_\_\_, 2004.



REVISION	DATE	DESCRIPTION	CHKD	APPR
Shaw Environmental, Inc.		Department of the Army Sacramento District, Corps of Engineers Sacramento, California		
DESIGNED: E. SCHMIDT		<b>FIGURE 5-5</b> <b>CARBON TETRACHLORIDE CONCENTRATIONS</b> <b>DEEP MONITORING PROBES</b> <b>OPERABLE UNIT CARBON TETRACHLORIDE</b> <b>FORMER FORT ORD, CALIFORNIA</b>		
DRAWN: K. BLACK				
CHECKED: P. KELSALL				
SUBMITTED: _____				
DATE: _____		SCALE: _____	SPEC. No. _____	
SHEET: _____		FILE No. CTdeep_Sept2004.mxd		



**LEGEND**

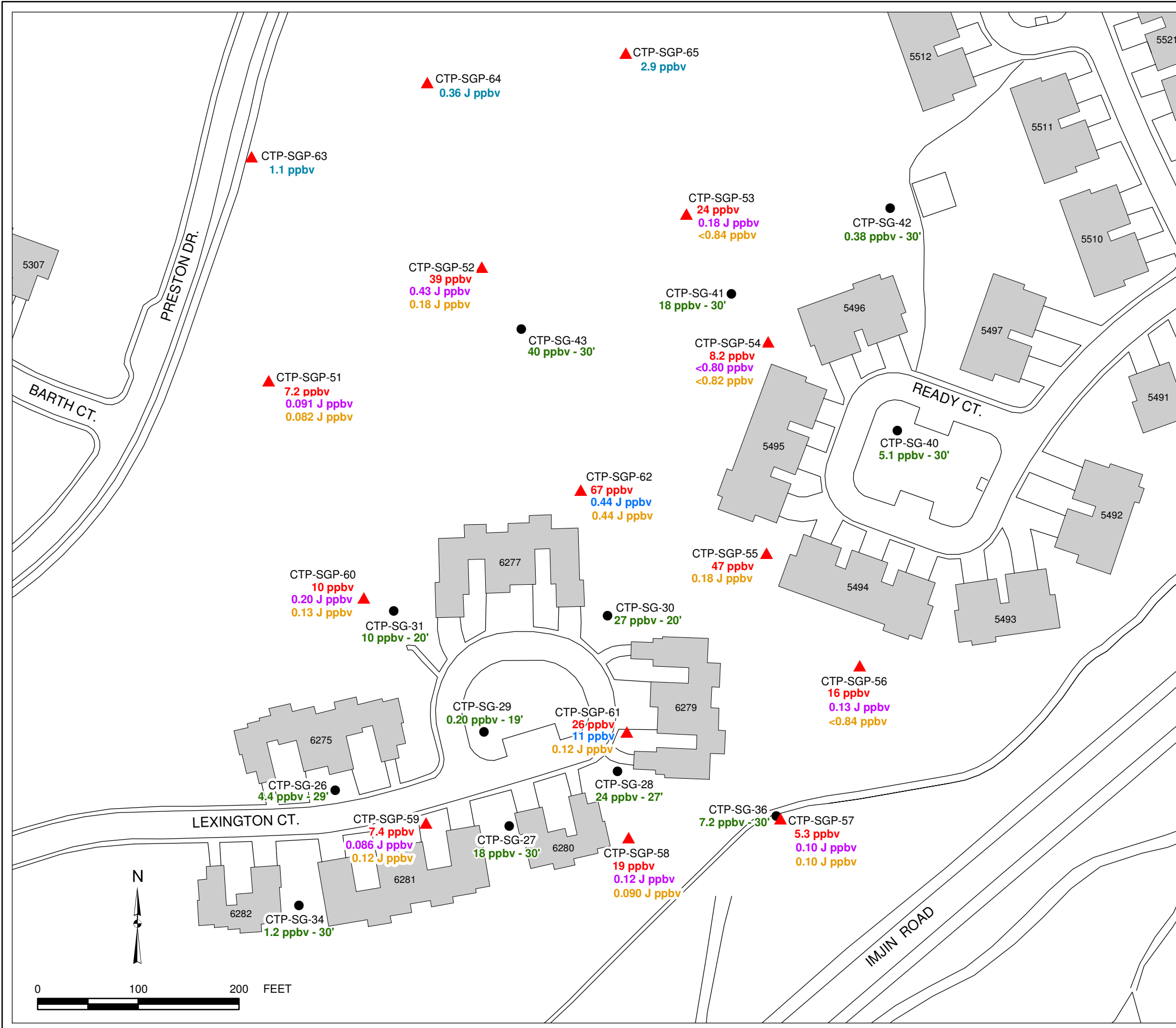
- ▲ INTERMEDIATE (55-60 FT.) MONITORING PROBE
- TEMPORARY SOIL GAS MONITORING PROBE SAMPLED MARCH TO JUNE 2003
- 230 ppbv CARBON TETRACHLORIDE CONCENTRATION MARCH-JUNE 2003; PROBE DEPTH SHOWN
- 1.2 ppbv CARBON TETRACHLORIDE CONCENTRATION MARCH 2004
- 1.2 ppbv CARBON TETRACHLORIDE CONCENTRATION APRIL 2004
- 1.2 ppbv CARBON TETRACHLORIDE CONCENTRATION JUNE 2004
- 3.1 ppbv CARBON TETRACHLORIDE CONCENTRATION SEPTEMBER 2004
- - - CARBON TETRACHLORIDE CONCENTRATION CONTOURS AT 60 FT. DEPTH (ppbv) PRIOR TO SVE OPERATION; DASHED WHERE INFERRED
- BUILDING

**NOTES:**

1. March Carbon Tetrachloride concentrations measured between 3/29/04 and 3/31/04, before SVE operation.
2. April Carbon Tetrachloride concentrations measured 4/28/04.
3. June Carbon Tetrachloride concentrations measured between 6/15/04 and 6/17/04.
4. September Carbon Tetrachloride concentrations measured 9/1/04 and 9/2/04.
5. J is a laboratory qualifier (estimated value).
6. SVE operation started April 6, 2004.
7. Phase I SVE operation April 6 to June 14, 2004; Phase II Sept. 9 to \_\_\_\_\_, 2004.

REVISION	DATE	DESCRIPTION	CHKD	APPR
		Department of the Army Sacramento District, Corps of Engineers Sacramento, California		
DESIGNED: E. SCHMIDT		<b>FIGURE 5-6</b> <b>CARBON TETRACHLORIDE CONCENTRATIONS</b> <b>INTERMEDIATE MONITORING PROBES</b> <b>OPERABLE UNIT CARBON TETRACHLORIDE</b> <b>FORMER FORT ORD, CALIFORNIA</b>		
DRAWN: K. BLACK				
CHECKED: P. KELSALL				
SUBMITTED: _____ DATE _____				
SCALE: _____		SPEC. No. _____		
SHEET _____		FILE No. CTinter_Sept2004.mxd		



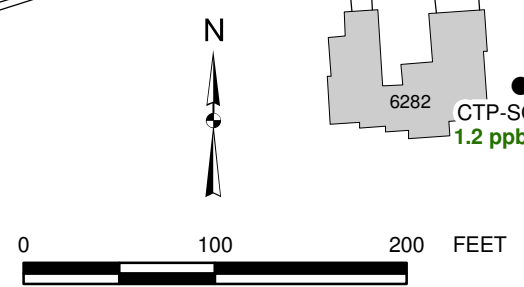


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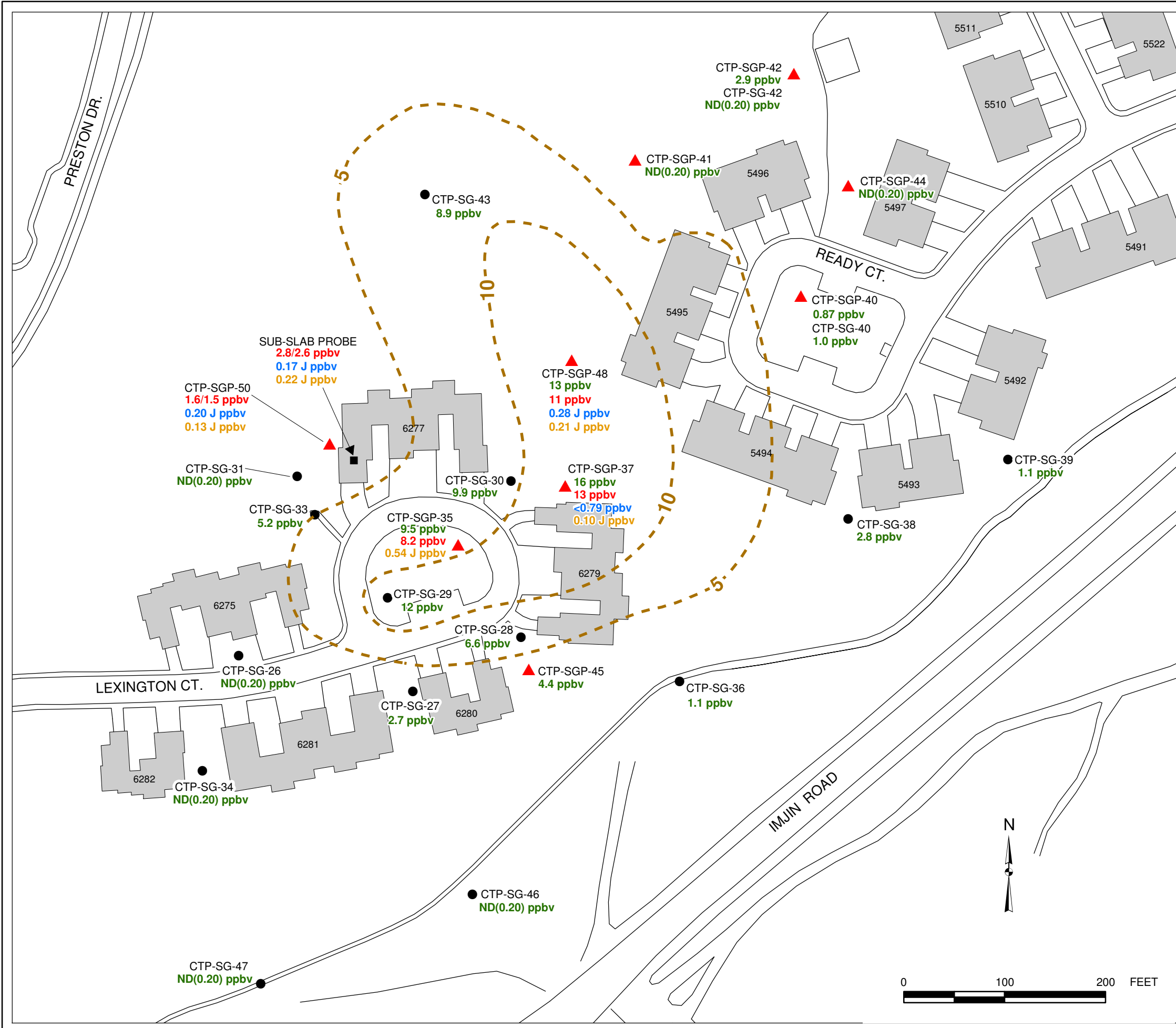
- ▲ SHALLOW (25-30 FT.) MONITORING PROBE
- TEMPORARY SOIL GAS MONITORING PROBE SAMPLED MARCH TO JUNE 2003
- 18 ppbv - 30' CARBON TETRACHLORIDE CONCENTRATION MARCH-JUNE 2003; PROBE DEPTH SHOWN
- 26 ppbv CARBON TETRACHLORIDE CONCENTRATION MARCH 2004
- 11 ppbv CARBON TETRACHLORIDE CONCENTRATION APRIL 2004
- <0.80 ppbv CARBON TETRACHLORIDE CONCENTRATION MAY 2004
- 0.12 J ppbv CARBON TETRACHLORIDE CONCENTRATION JUNE 2004
- 2.9 ppbv CARBON TETRACHLORIDE CONCENTRATION SEPTEMBER 2004
- BUILDING

**NOTES:**

1. March Carbon Tetrachloride concentrations measured between 3/25/04 and 3/31/04, before SVE operation.
2. April Carbon Tetrachloride concentrations measured 4/28/04.
3. May Carbon Tetrachloride concentrations measured 5/18/04 and 5/19/04.
4. June Carbon Tetrachloride concentrations measured between 6/15/04 and 6/17/04.
5. September Carbon Tetrachloride concentrations measured 9/1/04 and 9/2/04.
6. J is a laboratory qualifier (estimated value).
7. Phase I SVE operation April 6 to June 14, 2004; Phase II Sept. 9 to \_\_\_\_, 2004.



REVISION	DATE	DESCRIPTION	CHKD	APPR
		Department of the Army Sacramento District, Corps of Engineers Sacramento, California		
DESIGNED: E. SCHMIDT		<b>FIGURE 5-7</b> <b>CARBON TETRACHLORIDE CONCENTRATIONS</b> <b>SHALLOW MONITORING PROBES</b> <b>OPERABLE UNIT CARBON TETRACHLORIDE</b> <b>FORMER FORT ORD, CALIFORNIA</b>		
DRAWN: K. BLACK				
CHECKED: P. KELSALL				
SUBMITTED: _____		DATE _____	SCALE: _____ SHEET _____	SPEC. No. _____ FILE No. _____ CTshallow_Sep2004.mxd



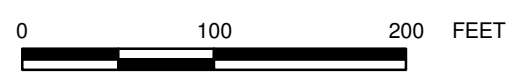
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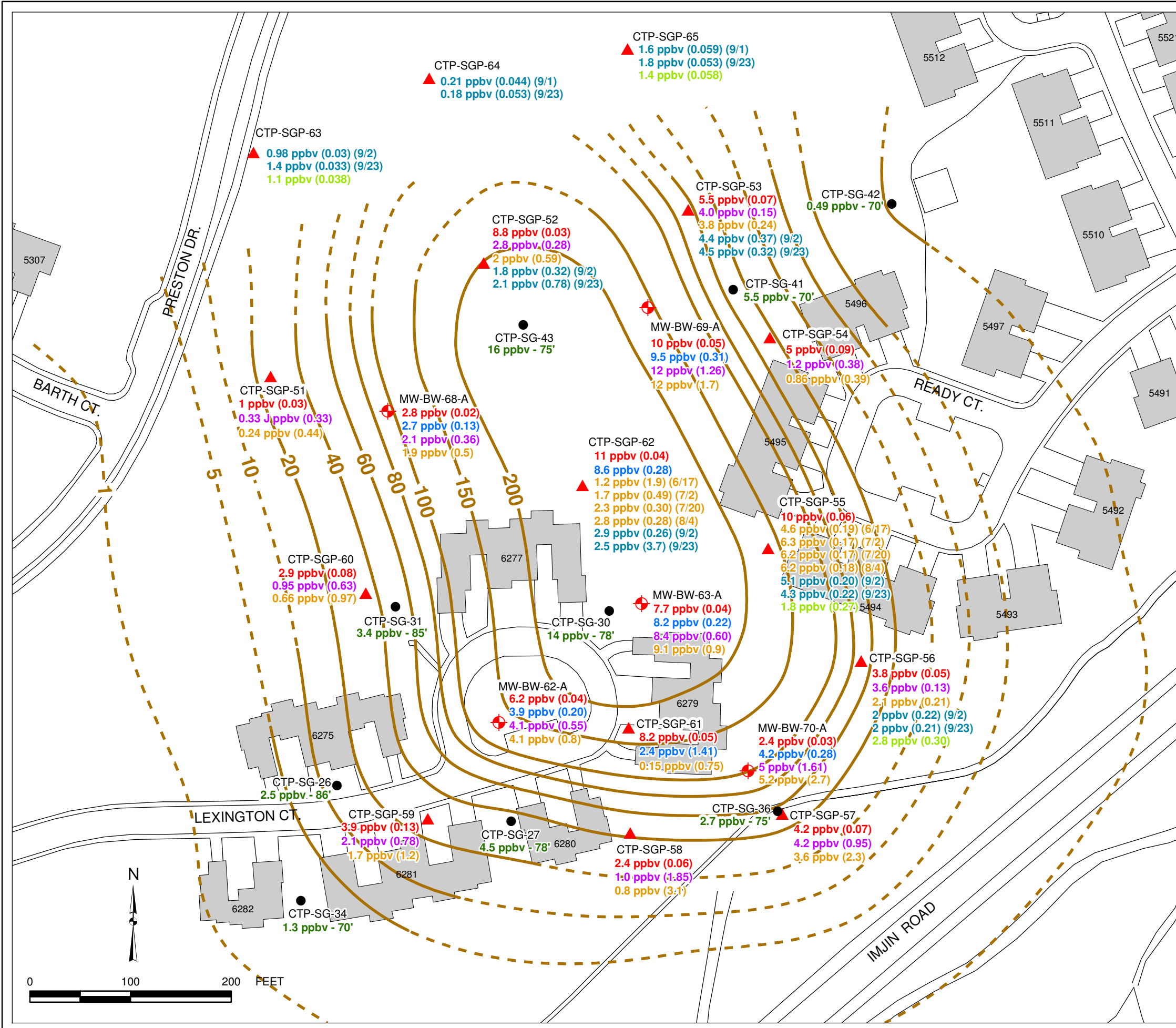
- ▲ NEAR SURFACE (6 FT.) MONITORING PROBE
- TEMPORARY SOIL GAS MONITORING PROBE SAMPLED MARCH TO JUNE 2003
- 13 ppbv CARBON TETRACHLORIDE CONCENTRATION MARCH-JUNE 2003
- 11 ppbv CARBON TETRACHLORIDE CONCENTRATION MARCH 2004
- 0.28 J ppbv CARBON TETRACHLORIDE CONCENTRATION APRIL 2004
- 0.21 J ppbv CARBON TETRACHLORIDE CONCENTRATION JUNE 2004
- - - CARBON TETRACHLORIDE CONCENTRATION CONTOURS AT 6 FT. DEPTH (ppbv); PRIOR TO SVE OPERATION
- BUILDING

**NOTES:**

1. March Carbon Tetrachloride concentrations measured between 3/25/04 and 3/31/04, except CTP-SGP-50 and Sub-Slab Probe measured 3/9/04 and 3/15/04, before SVE operation.
2. April Carbon Tetrachloride concentrations measured 4/28/04.
3. June Carbon Tetrachloride concentrations measured 6/18/04.
4. Carbon Tetrachloride concentration contours provided by Mactec and based on data collected March to July 2003; adjusted for March 2004 data.
5. J is a laboratory qualifier (estimated value).
6. Phase I SVE operation April 6 to June 14, 2004; Phase II Sept. 9 to \_\_\_\_, 2004.

REVISION	DATE	DESCRIPTION	CHKD	APPR
		Department of the Army Sacramento District, Corps of Engineers Sacramento, California		
DESIGNED: E. SCHMIDT		<b>FIGURE 5-8</b> <b>CARBON TETRACHLORIDE CONCENTRATIONS</b> <b>NEAR-SURFACE MONITORING PROBES</b> <b>OPERABLE UNIT CARBON TETRACHLORIDE</b> <b>FORMER FORT ORD, CALIFORNIA</b>		
DRAWN: K. BLACK				
CHECKED: P. KELSALL				
SUBMITTED: _____		DATE _____		SCALE: SHEET _____
				SPEC. No. FILE No. CTsurface_June2004.mxd



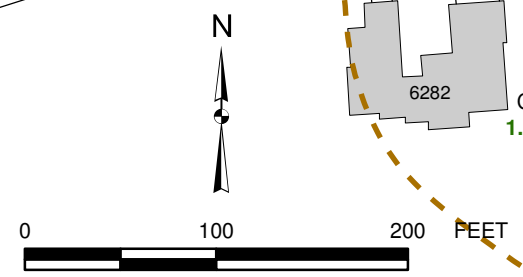


**LEGEND**

- SOIL VAPOR EXTRACTION WELL
- DEEP (80-85 FT.) MONITORING PROBE
- TEMPORARY SOIL GAS MONITORING PROBE SAMPLED MARCH TO JUNE 2003
- 14 ppbv** CHLOROFORM CONCENTRATION MARCH-JUNE 2003; DEPTH OF PROBE SHOWN
- 3.8 ppbv (0.05)** CHLOROFORM CONCENTRATION MARCH 2004 (CHLOROFORM / CARBON TETRACHLORIDE RATIO)
- 4.2 ppbv (0.28)** CHLOROFORM CONCENTRATION APRIL 2004 (CHLOROFORM / CARBON TETRACHLORIDE RATIO)
- 3.6 ppbv (0.13)** CHLOROFORM CONCENTRATION MAY 2004 (CHLOROFORM / CARBON TETRACHLORIDE RATIO)
- 2.1 ppbv (0.21)** CHLOROFORM CONCENTRATION JUNE-AUGUST 2004 (CHLOROFORM / CARBON TETRACHLORIDE RATIO)
- 2 ppbv (0.22)** CHLOROFORM CONCENTRATION SEPTEMBER 2004 (CHLOROFORM / CARBON TETRACHLORIDE RATIO)
- 2.8 ppbv (0.30)** CHLOROFORM CONCENTRATION OCTOBER 2004 (CHLOROFORM / CARBON TETRACHLORIDE RATIO)
- CARBON TETRACHLORIDE CONCENTRATION CONTOURS AT 85 FT. DEPTH (ppbv) PRIOR TO SVE OPERATION; DASHED WHERE INFERRED
- BUILDING

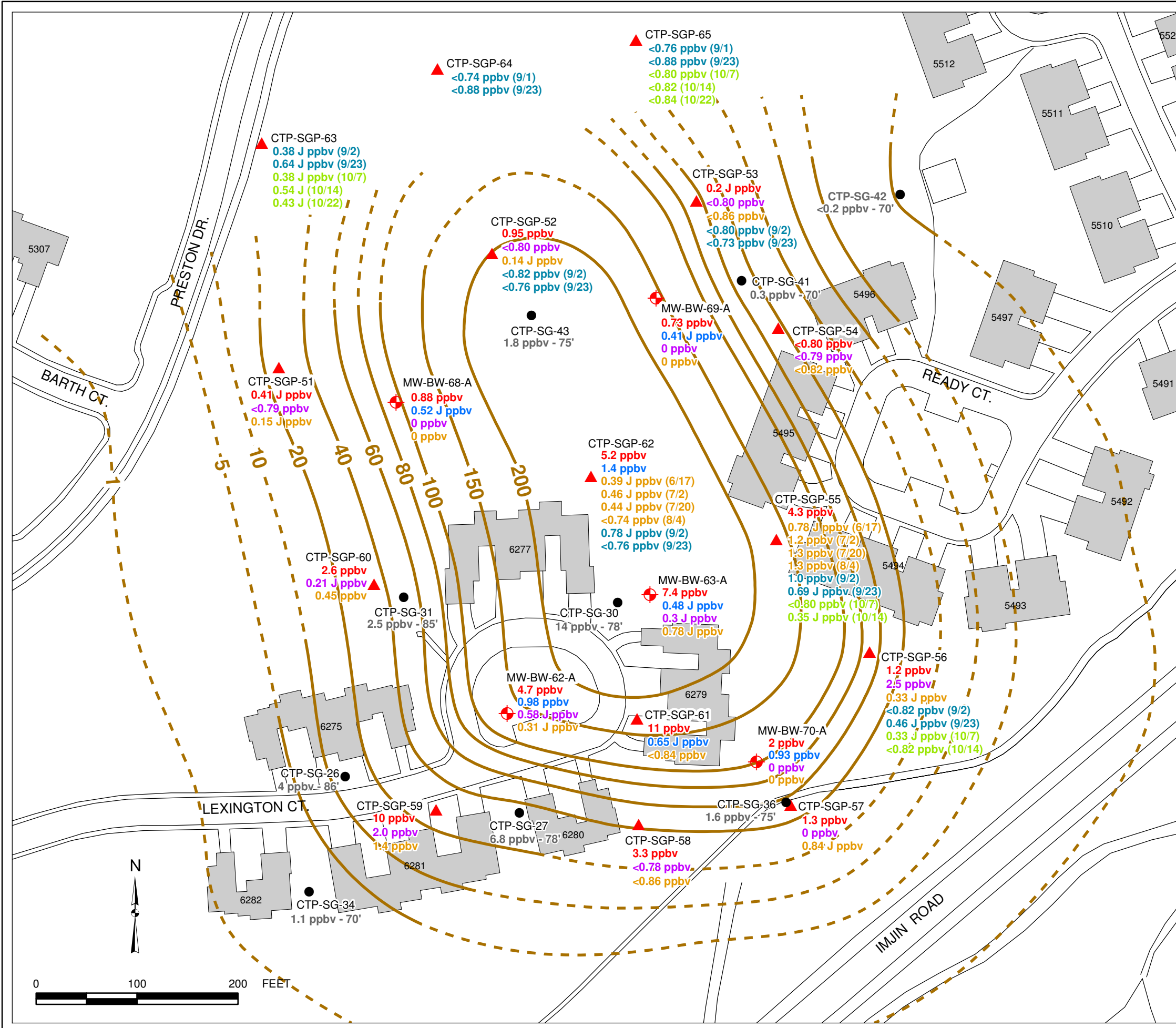
**NOTES:**

1. March Chloroform concentrations measured between 3/29/04 and 4/1/04, before SVE operation.
2. April Chloroform concentrations measured 4/28/04.
3. May Chloroform concentrations measured 5/18/04.
4. June-August Chloroform concentrations measured 6/14, 6/17, 7/2, 7/20, and 8/4/04.
5. September Chloroform concentrations measured 9/2/04 and 9/23/04.
6. October Chloroform concentrations measured 10/6/04 and 10/7/04.
7. J is a laboratory qualifier (estimated value).
8. Phase I SVE operation April 6 to June 14, 2004; Phase II Sept. 9 to \_\_\_\_, 2004.



REVISION	DATE	DESCRIPTION	CHKD	APPR
		Department of the Army Sacramento District, Corps of Engineers Sacramento, California		
DESIGNED: E. SCHMIDT		<b>FIGURE 5-9</b> <b>CHLOROFORM CONCENTRATIONS</b> <b>DEEP MONITORING PROBES</b> <b>OPERABLE UNIT CARBON TETRACHLORIDE</b> <b>FORMER FORT ORD, CALIFORNIA</b>		
DRAWN: K. BLACK				
CHECKED: P. KELSALL				
SUBMITTED:				
DATE		SCALE:	SPEC. No.	
		SHEET	FILE No. CTdeep_CF.mxd	



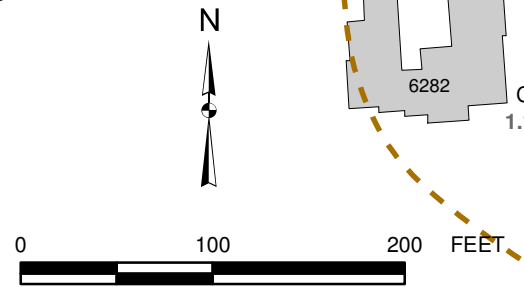


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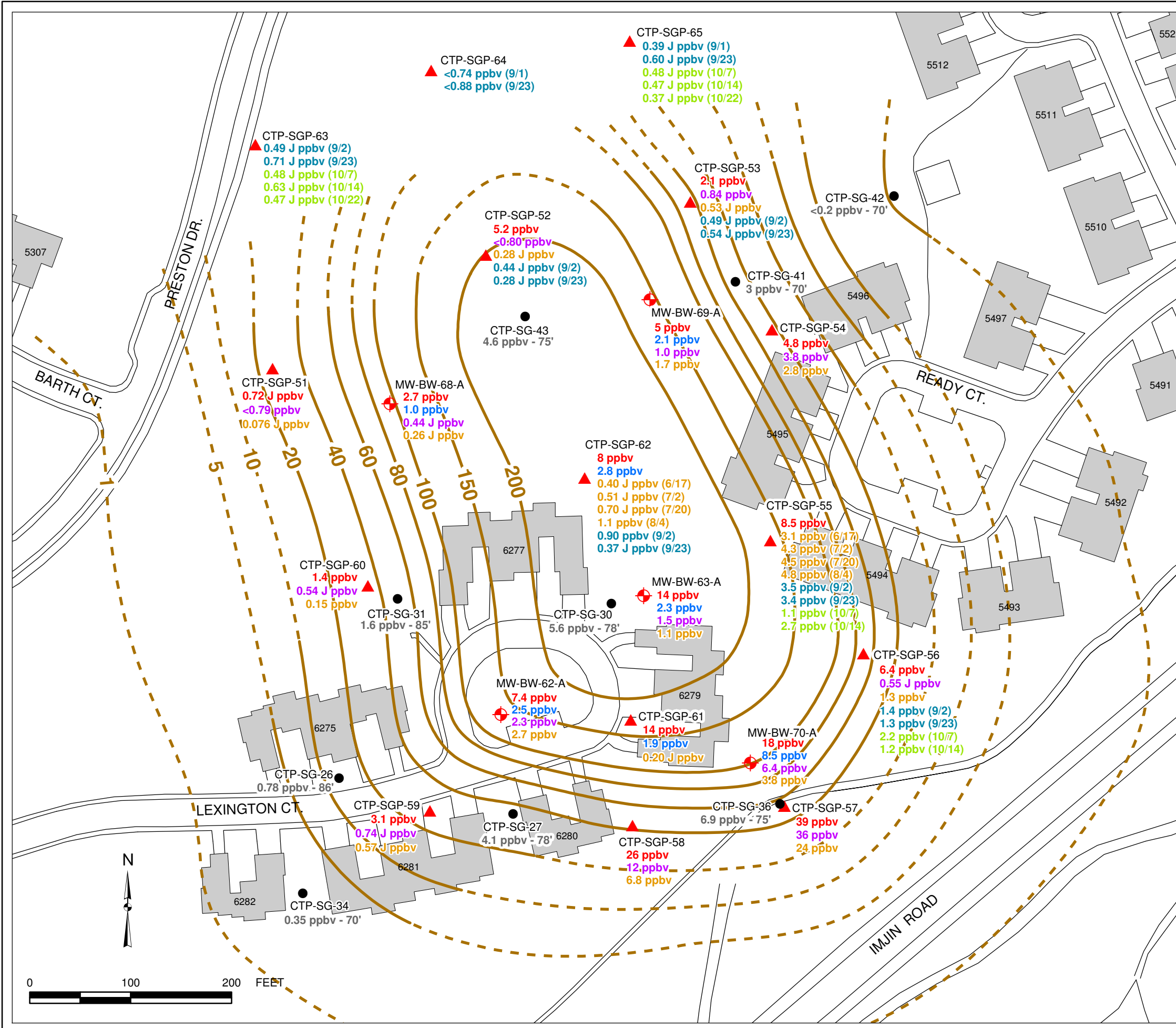
- SOIL VAPOR EXTRACTION WELL
- DEEP (80-85 FT.) MONITORING PROBE
- TEMPORARY SOIL GAS MONITORING PROBE SAMPLED MARCH TO JUNE 2003
- 14 ppbv TRICHLOROETHENE CONCENTRATION MARCH-JUNE 2003; DEPTH OF PROBE SHOWN
- 1.2 ppbv TRICHLOROETHENE CONCENTRATION - MARCH 2004
- 0.48 ppbv TRICHLOROETHENE CONCENTRATION - APRIL 2004
- 2.5 ppbv TRICHLOROETHENE CONCENTRATION - MAY 2004
- 0.33 ppbv TRICHLOROETHENE CONCENTRATION JUNE-AUGUST 2004
- 0.46 ppbv TRICHLOROETHENE CONCENTRATION SEPTEMBER 2004
- 0.33 ppbv TRICHLOROETHENE CONCENTRATION OCTOBER 2004
- CARBON TETRACHLORIDE CONCENTRATION CONTOURS AT 85 FT. DEPTH (ppbv) PRIOR TO SVE OPERATION; DASHED WHERE INFERRED
- BUILDING

**NOTES:**

1. March Trichloroethene concentrations measured between 3/29/04 and 4/1/04, before SVE operation.
2. April Trichloroethene concentrations measured 4/28/04.
3. May Trichloroethene concentrations measured 5/18/04.
4. June-August Trichloroethene concentrations measured 6/14, 6/17, 7/2, 7/20, and 8/4/04.
5. September Trichloroethene concentrations measured 9/2/04 and 9/23/04.
6. October Trichloroethene concentrations measured 10/7/04, 10/14/04, and 10/22/04.
7. J is a laboratory qualifier (estimated value).
8. Phase I SVE operation April 6 to June 14, 2004; Phase II Sept. 9 to \_\_\_\_\_, 2004.



REVISION	DATE	DESCRIPTION	CHKD	APPR
Shaw Environmental, Inc.		Department of the Army Sacramento District, Corps of Engineers Sacramento, California		
DESIGNED: E. SCHMIDT		<b>FIGURE 5-10</b> <b>TRICHLOROETHENE CONCENTRATIONS</b> <b>DEEP MONITORING PROBES</b> <b>OPERABLE UNIT CARBON TETRACHLORIDE</b> <b>FORMER FORT ORD, CALIFORNIA</b>		
DRAWN: K. BLACK				
CHECKED: P. KELSALL				
SUBMITTED: _____				
DATE _____		SCALE: _____	SPEC. No. _____	
SHEET _____		FILE No. CTdeep_TCE.mxd		

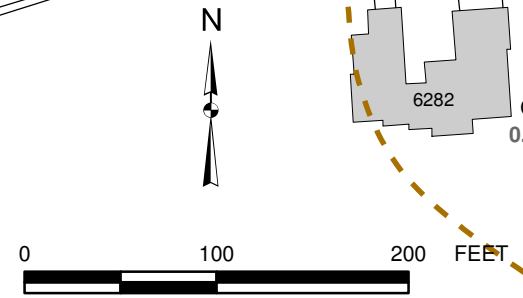


**LEGEND**

- SOIL VAPOR EXTRACTION WELL
- DEEP (80-85 FT.) MONITORING PROBE
- TEMPORARY SOIL GAS MONITORING PROBE SAMPLED MARCH TO JUNE 2003
- 14 ppbv TETRACHLOROETHENE CONCENTRATION MARCH-JUNE 2003; DEPTH OF PROBE SHOWN
- 6.4 ppbv TETRACHLOROETHENE CONCENTRATION - MARCH 2004
- 0.48 ppbv TETRACHLOROETHENE CONCENTRATION - APRIL 2004
- 0.55 ppbv TETRACHLOROETHENE CONCENTRATION - MAY 2004
- 1.3 ppbv TETRACHLOROETHENE CONCENTRATION JUNE-AUGUST 2004
- 1.3 ppbv TETRACHLOROETHENE CONCENTRATION SEPTEMBER 2004
- 2.2 ppbv TETRACHLOROETHENE CONCENTRATION OCTOBER 2004
- CARBON TETRACHLORIDE CONCENTRATION CONTOURS AT 85 FT. DEPTH (ppbv) PRIOR TO SVE OPERATION; DASHED WHERE INFERRED
- BUILDING

**NOTES:**

1. March Tetrachloroethene concentrations measured between 3/29/04 and 4/1/04, before SVE operation.
2. April Tetrachloroethene concentrations measured 4/28/04.
3. May Tetrachloroethene concentrations measured 5/18/04.
4. June-August Tetrachloroethene concentrations measured 6/14, 6/17, 7/2, 7/20, and 8/4/04.
5. September Tetrachloroethene concentrations measured 9/2/04 and 9/23/04.
6. October Tetrachloroethene concentrations measured 10/7/04, 10/14/04, and 10/22/04.
7. J is a laboratory qualifier (estimated value).
8. Phase I SVE operation April 6 to June 14, 2004; Phase II Sept. 9 to \_\_\_\_\_, 2004.



REVISION	DATE	DESCRIPTION	CHKD	APPR
		Department of the Army Sacramento District, Corps of Engineers Sacramento, California		
DESIGNED: E. SCHMIDT		<b>FIGURE 5-11</b> TETRACHLOROETHENE CONCENTRATIONS DEEP MONITORING PROBES OPERABLE UNIT CARBON TETRACHLORIDE FORMER FORT ORD, CALIFORNIA		
DRAWN: K. BLACK				
CHECKED: P. KELSALL				
SUBMITTED: _____				



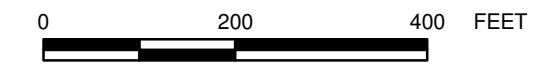


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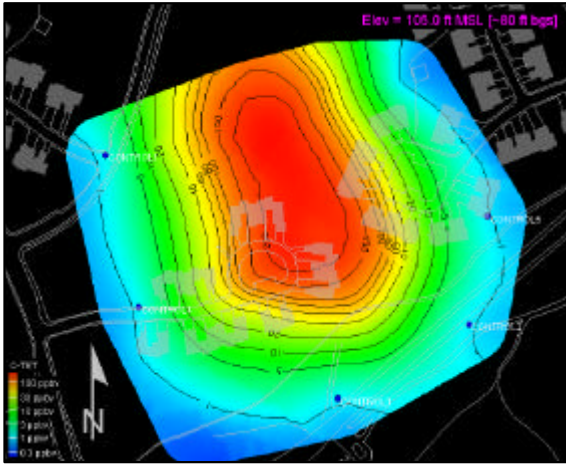
- ◆ SOIL VAPOR EXTRACTION WELL
- ▲ DEEP (80-85 FT.) SOIL VAPOR MONITORING PROBE
- <0.79 ppbv SOIL GAS CONCENTRATION (ppbv); MEASURED 9/1/04  
 CF Chloroform  
 CT Carbon tetrachloride  
 TCE Trichloroethene  
 PCE Tetrachloroethene
- SOIL GAS CARBON TETRACHLORIDE CONCENTRATION CONTOURS AT 85 FT. DEPTH (ppbv); DASHED WHERE INFERRED
- GROUNDWATER MONITORING WELL
- A-AQUIFER CARBON TETRACHLORIDE CONCENTRATION CONTOURS (ppbv)
- BUILDING

**NOTES:**

1. Soil gas concentration contours based on data collected prior to soil vapor extraction.
2. Groundwater concentration contours provided by Mactec and based on data collected December 2003.



REVISION	DATE	DESCRIPTION	CHKD	APPR
		Department of the Army Sacramento District, Corps of Engineers Sacramento, California		
DESIGNED: P. KELSALL	<b>FIGURE 5-12</b> <b>DATA FROM PRESTON DRIVE MONITORING PROBE OPERABLE UNIT</b> <b>CARBON TETRACHLORIDE PLUME</b> <b>FORMER FORT ORD, CALIFORNIA</b>			
DRAWN: K. BLACK				
CHECKED: P. KELSALL				
SUBMITTED:	DATE	SCALE:	FILE No.	
		SHEET	CTsoil+gw.mxd	

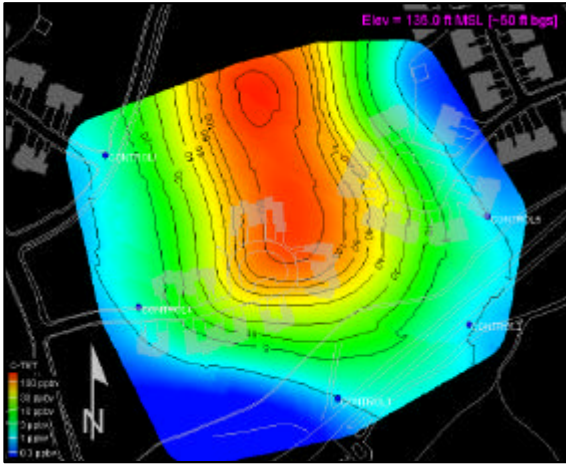


PRE-SVE OPERATION

END OF PHASE 1

END OF PHASE 2

REVISION	DATE	DESCRIPTION	CHKD	APPR
		DEPARTMENT OF THE ARMY SACRAMENTO DISTRICT, CORPS OF ENGINEERS SACRAMENTO, CALIFORNIA		
DESIGNED:	FIGURE 6-1			
J. MATOS	CARBON TETRACHLORIDE CONCENTRATIONS			
DRAWN:	(80 FT. DEPTH) PRE- AND POST SVE OPERATION			
K. BLACK	SVE PILOT TEST			
CHECKED:	OPERABLE UNIT CARBON TETRACHLORIDE			
P. KELSALL	FORMER FORT ORD, CALIFORNIA			
SUBMITTED:	DATE APPROVED:	SCALE:	SPEC. No.	
		SHEET	FILE No.	
		-	783751SJ-A174	

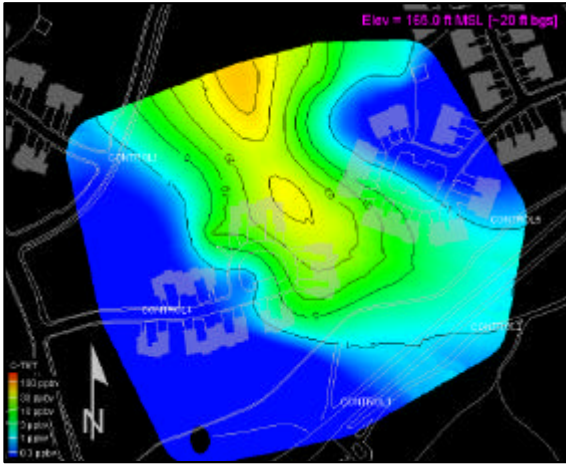


PRE-SVE OPERATION

END OF PHASE 1

END OF PHASE 2

REVISION	DATE	DESCRIPTION	CHKD	APPR
		DEPARTMENT OF THE ARMY SACRAMENTO DISTRICT, CORPS OF ENGINEERS SACRAMENTO, CALIFORNIA		
DESIGNED:	FIGURE 6-2 CARBON TETRACHLORIDE CONCENTRATIONS (50 FT. DEPTH) PRE- AND POST SVE OPERATION SVE PILOT TEST OPERABLE UNIT CARBON TETRACHLORIDE FORMER FORT ORD, CALIFORNIA			
J. MATOS				
DRAWN:				
K. BLACK				
CHECKED:				
P. KELSALL				
SUBMITTED:	DATE APPROVED:	SCALE:	SPEC. No.	
		SHEET	FILE No.	
		-	783751SJ-A175	

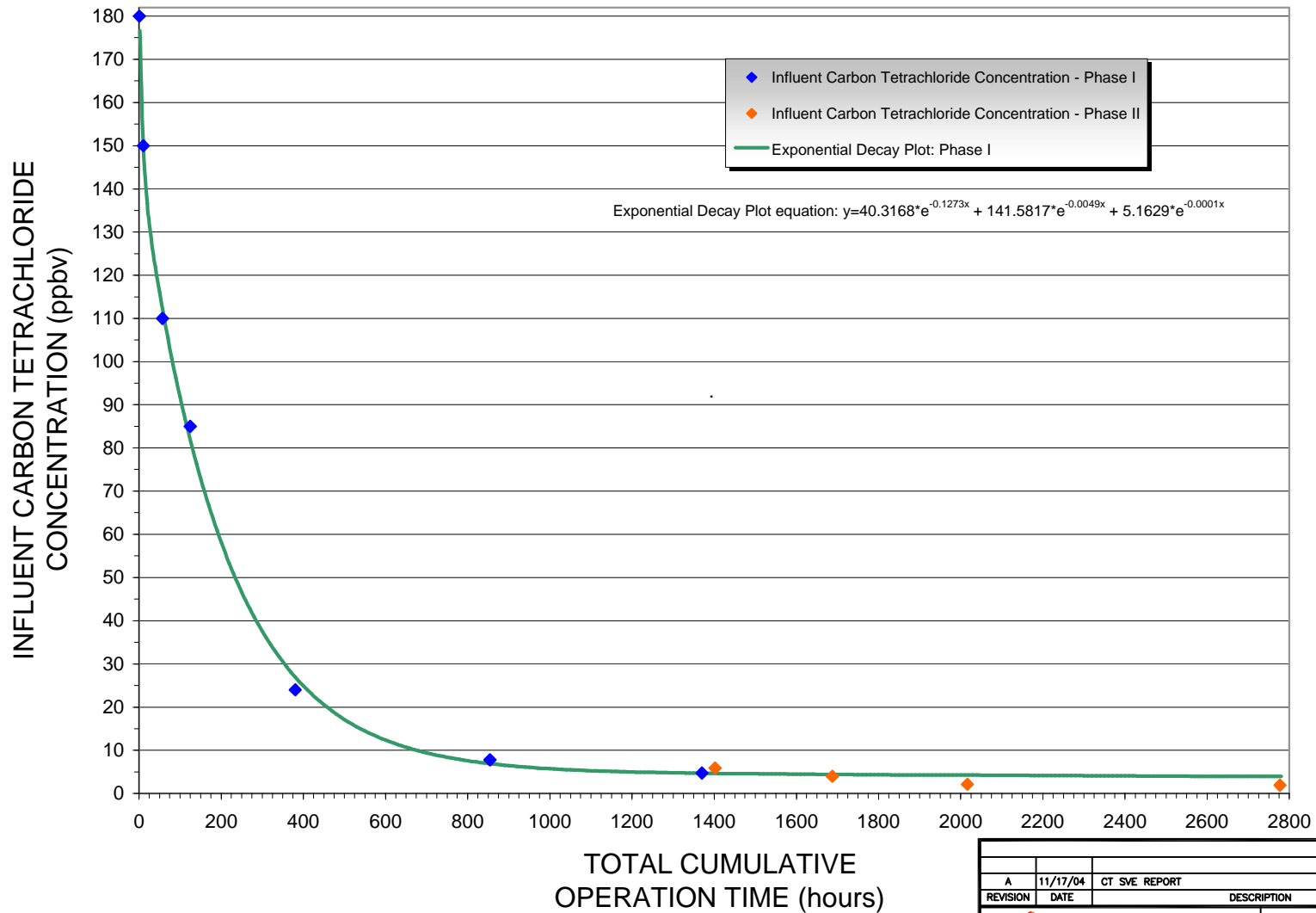


PRE-SVE OPERATION

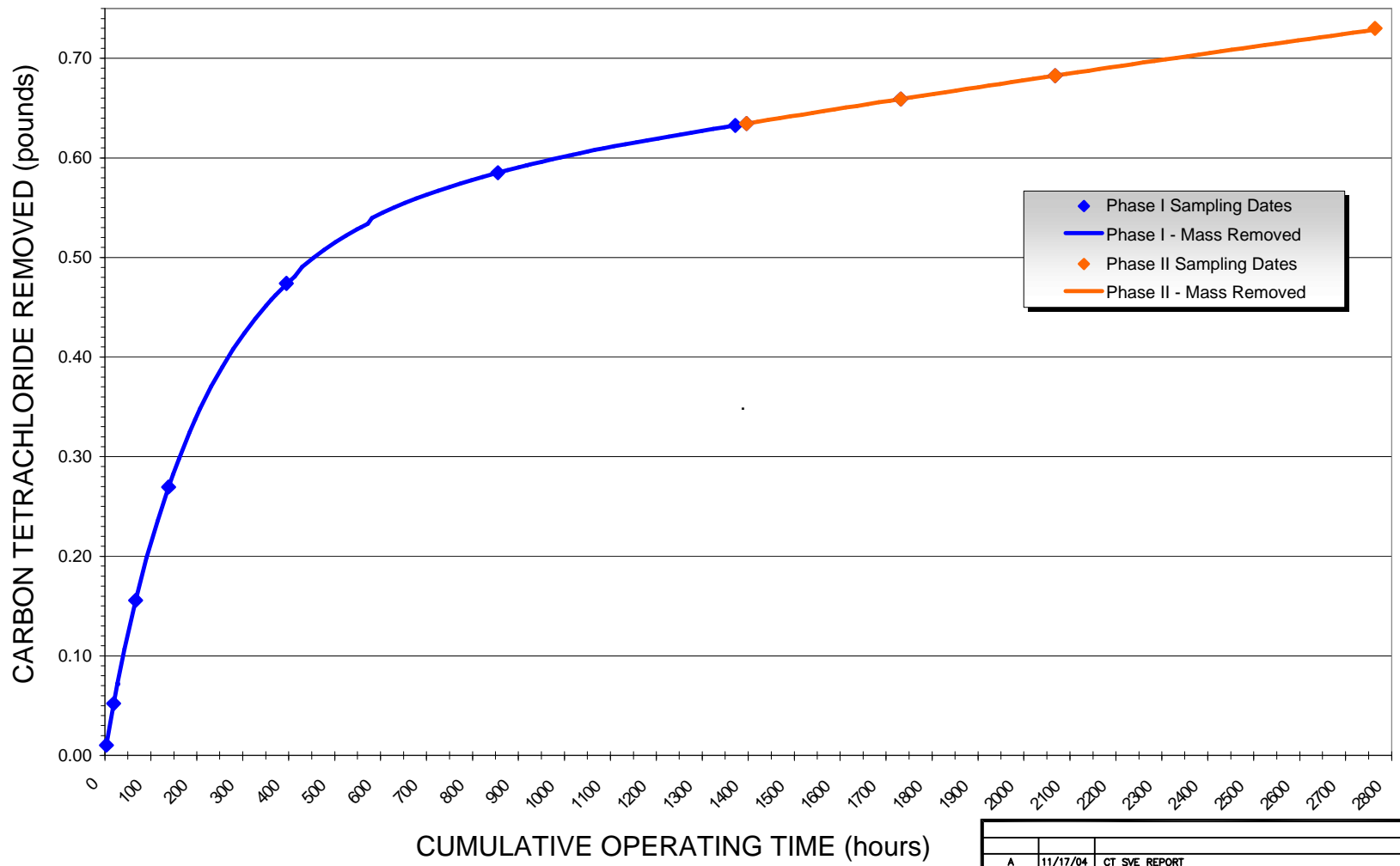
END OF PHASE 1


END OF PHASE 2

REVISION	DATE	DESCRIPTION	CHKD	APPR
		DEPARTMENT OF THE ARMY SACRAMENTO DISTRICT, CORPS OF ENGINEERS SACRAMENTO, CALIFORNIA		
DESIGNED:	FIGURE 6-3 CARBON TETRACHLORIDE CONCENTRATIONS (20 FT. DEPTH) PRE- AND POST SVE OPERATION SVE PILOT TEST OPERABLE UNIT CARBON TETRACHLORIDE FORMER FORT ORD, CALIFORNIA			
J. MATOS				
DRAWN:				
K. BLACK				
CHECKED:				
P. KELSALL				
SUBMITTED:	DATE APPROVED:	SCALE:	SPEC. No.	
		SHEET	FILE No.	
		-	783751SJ-A176	

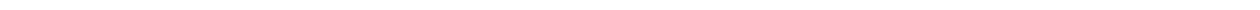


A	11/17/04	CT SVE REPORT	ES	PK
REVISION	DATE	DESCRIPTION	CHKD	APPR
		DEPARTMENT OF THE ARMY SACRAMENTO DISTRICT, CORPS OF ENGINEERS SACRAMENTO, CALIFORNIA		
DESIGNED:	FIGURE 7-1			
E. SCHMIDT	EXPONENTIAL PLOT OF INFLUENT CARBON TETRACHLORIDE CONCENTRATION vs. TIME			
DRAWN:	SVE PILOT TEST			
K. BLACK	OPERABLE UNIT CARBON TETRACHLORIDE			
CHECKED:	FORMER FORT ORD, CALIFORNIA			
P. KELSALL	DATE SUBMITTED:	DATE APPROVED:	SCALE:	SPEC. No.
			SHEET	FILE No.
			-	783751SJ-A177



A		11/17/04	CT SVE REPORT	ES	PK
REVISION	DATE	DESCRIPTION		CHKD	APPR
			DEPARTMENT OF THE ARMY SACRAMENTO DISTRICT, CORPS OF ENGINEERS SACRAMENTO, CALIFORNIA		
DESIGNED:	FIGURE 7-2				
E. SCHMIDT	CUMULATIVE MASS OF CARBON TETRACHLORIDE				
DRAWN:	REMOVED vs. CUMULATIVE OPERATING TIME				
K. BLACK	SVE PILOT TEST				
CHECKED:	OPERABLE UNIT CARBON TETRACHLORIDE				
P. KELSALL	FORMER FORT ORD, CALIFORNIA				
SUBMITTED:	DATE APPROVED:	SCALE:	SHEET	FILE No.	SPEC. No.
			-	783751SJ-A178	

## *Photographs*





**Photograph 1-1  
Lexington Court Building**





**Photograph 2-1**

**Installing Monitoring Probe SGP- 55, Ready Court**



**Photograph 2-2  
Pipeline Installation**





**Photograph 2-3  
Well Vault Construction**



**Photograph 2-4  
Treatment System Blower Unit**



**Photograph 2-5**

**Soundproofing**





**Photograph 2-6  
Granulated Activated Carbon Units**

